CRYPTOCURRENCY BASED ON ISLAMIC FINANCE AND BASIC CRYPTOCURRENCY MODEL PROPOSED UNDER ISLAMIC CONTROLS AND STANDARDS

2023
MASTER THESIS
FINANCE AND ISLAMIC BANKING

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Prepared as
Master Thesis

KARABUK
June 2023

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THESIS APPROVAL PAGE

I certify that in my opinion the thesis submitted by Doha RAI titled "CRYPTOCURRENCY BASED ON ISLAMIC FINANCE AND BASIC CRYPTOCURRENCY MODEL PROPOSED UNDER ISLAMIC CONTROLS AND STANDARDS" is fully adequate in scope and in quality as a thesis for the degree of Master of Science.

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DECLARATION

I hereby declare that this thesis is the result of my work and all information included has been obtained and expounded following the academic rules and ethical policy specified by the institute. Besides, I declare that all the statements, results, and materials, not original to this thesis have been cited and referenced literally.

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FOREWORD

In the name of Allah, the Most Gracious, the Most Merciful.

All praise is due to Allah, the Lord of all the worlds. I begin this foreword by expressing my deepest gratitude and acknowledging the blessings and guidance bestowed upon me throughout the journey of completing my master's thesis. It is with immense humility that I recognize the divine presence of Allah, for without His guidance, none of this would have been possible.

I would like to extend my heartfelt appreciation to my thesis advisor, Asst. Prof. Dr. Muhammed Ali YETGN, whose unwavering support and invaluable guidance have been instrumental in shaping the outcome of this research. His expertise, patience, and dedication have been sources of inspiration and motivation that have pushed me to exceed my expectations. I am truly grateful for his mentorship, which has played a pivotal role in my academic growth.

Next, I would like to express my deepest gratitude to my beloved husband, Radwan Aldahhan, for his unwavering support, encouragement, and understanding throughout this demanding journey. Your belief in my abilities and constant motivation has been a constant source of strength. Your patience and willingness to help have been immeasurable, and I am forever grateful for your presence in my life.

To my dear parents, Taha Rai and Ghurob Faor, your unconditional love and unwavering support have been the bedrock of my success. Your sacrifices, guidance, and prayers have been instrumental in shaping my character and enabling me to pursue my dreams. I owe my accomplishments to your unwavering belief in me, and I am forever grateful for your boundless love and encouragement.

I would also like to extend my appreciation to my siblings, Rama Rai, Maryam Rai, Rima Rai, Husain Rai, and Abdulkerim Rai, for their constant encouragement and unwavering support. Your love, companionship, and belief in my abilities have been an endless source of motivation, and I am deeply grateful for each one of you.

A special thanks go to my dear friends Safiye and Nura. Safiye, your unwavering support, and comforting presence have been a lifeline during moments of doubt and uncertainty. Your kind words and empathy have provided much-needed solace throughout this journey. Nura, your unwavering motivation and generous sharing of knowledge have been invaluable. Your encouragement and belief in my capabilities have been a driving force that I will forever cherish.

Finally, I extend my gratitude to all those who have directly or indirectly supported me in this endeavor. May Allah bless you abundantly and grant you success in all your endeavors.

With heartfelt gratitude,

ABSTRACT

This research investigates the permissibility of cryptocurrencies in Islamic finance through a thorough review of the literature and analysis of scholarly opinions and fatwas. The findings show a divide among Islamic scholars on the compatibility of cryptocurrencies with Islamic principles. Some academics advocate for the legalization of cryptocurrencies, highlighting their potential as legitimate payment methods and advocating for appropriate regulations. Other scholars, on the other hand, believe cryptocurrencies are illegal, citing concerns about their volatility, speculative nature, and lack of government recognition. This research proposes a Sharia-compliant cryptocurrency model to bridge the gap between cryptocurrencies and Islamic finance, addressing identified concerns and encouraging adherence to Islamic principles. In assessing the compatibility of cryptocurrencies with Islamic finance, the study emphasizes the importance of transparency, accountability, risk-sharing, and compliance with Islamic principles. It guides policymakers, regulators, financial institutions, and individuals navigating the intersection of cryptocurrencies and Islamic finance, to increase financial inclusion and advance the development of ethical financial solutions in the digital age.

Keywords: Cryptocurrency; Islamic Finance; Bitcoin; Islamic Controls

ÖZ

Bu araştırma, İslami finansta kripto paraların caiz olup olmadığını incelemek için literatürün detaylı bir şekilde gözden geçirilmesi ve akademik görüşlerin ve fetvaların analizini içermektedir. Bulgular, İslami alimler arasında kripto paraların İslami prensiplerle uyumluluğu konusunda bir ayrılık olduğunu göstermektedir. Bazı akademisyenler, kripto paraların yasallaştırılmasını savunmakta, bunların meşru ödeme yöntemleri olarak potansiyellerine dikkat çekmekte ve uygun düzenlemelerin yapılmasını önermektedir. Diğer alimler ise kripto paraların yasa dışı olduğunu düşünmekte, volatilite, spekülatif doğa ve hükümet tanınmaması gibi endişeleri dile getirmektedir. Bu araştırma, kripto paralar ile İslami finans arasındaki boşluğu doldurmak için İslami esaslara uygun bir kripto para modeli önermektedir. Belirlenen endişeleri ele almakta ve İslami prensiplere uyumu teşvik etmektedir. Kripto paraların İslami finans ile uyumluluğunu değerlendirirken, çalışma şeffaflık, sorumluluk, risk paylaşımı ve İslami prensiplere uyumu vurgulamaktadır. Bu çalışma, kripto paralar ve İslami finansın kesişiminde yol alan politika yapıcılar, düzenleyiciler, finansal kurumlar ve bireylere rehberlik sağlamakta ve finansal inklüzyonu artırmayı ve dijital çağda etik finansal çözümlerin gelişimini teşvik etmeyi hedeflemektedir.

Anahtar Kelimeler: Kripto Para; İslami Finans; Bitcoin; İslami Kontroller

ARCHIVE RECORD INFORMATION

Title of the Thesis	Cryptocurrency Based on Islamic Finance and Basic Cryptocurrency Model Proposed Under Islamic Controls and Standards
Author of the Thesis	Doha RAI
Thesis Advisor	Asst. Prof. Dr. Muhammed Ali YETGİN
Status of the Thesis	Master
Date of the Thesis	23\06\2023
Field of the Thesis	Islamic Banking and Finance Department
Place of the Thesis	UNIKA / IGP
Total Page Number	101
Keywords	Cryptocurrency; Islamic Finance; Bitcoin; Islamic Controls

ARŞİV KAYIT BİLGİLERİ (in Turkish)

Tezin Adı	Islam Finans Esasli Kripto Para ve Islam Kontroller ve Standartlar Kapsaminda Önerilen Temel Kripto Para Modeli
Tezin Yazarı	Doha RAI
Tezin Danışmanı	Dr. Öğr. Üyesi Muhammed Ali YETGİN
Tezin Derecesi	Yüksek Lisans
Tezin Tarihi	23\06\2023
Tezin Alanı	Finans ve Katılım Bankacılığı
Tezin Yeri	KBU/LEE
Tezin Sayfa Sayısı	101
Anahtar Kelimeler	Kripto Para; İslami Finans; Bitcoin; İslami Kontroller

OBJECTIVE AND IMPORTANCE OF THE RESEARCH

This study has a dual objective: to investigate the relationship between cryptocurrencies and Islamic controls and scholars and to propose a basic cryptocurrency model based on Islamic finance principles. It seeks to assess the compatibility of cryptocurrencies with Islamic standards by taking into account factors such as transparency, accountability, risk-sharing, and the prohibition of usury. Furthermore, the study looks into the challenges posed by cryptocurrencies, such as speculative trading and illegal activity, in the context of Islamic controls. It assesses the strengths, weaknesses, opportunities, and threats associated with the adoption of cryptocurrencies in Islamic financial systems by evaluating the perspectives of Islamic scholars and conducting a comprehensive SWOT analysis. Finally, the research seeks to create a Sharia-compliant cryptocurrency model that addresses identified concerns and promotes compliance with Islamic principles, bridging the gap between cryptocurrencies and Islamic finance while guiding the development of ethical financial solutions in the digital era.

This research holds significant importance as it bridges the gap between the evolving world of cryptocurrencies and Islamic finance principles. It provides valuable insights that promote understanding by investigating the compatibility of cryptocurrencies with Islamic controls and standards. Furthermore, by proposing a cryptocurrency model aligned with Islamic finance principles, it contributes to financial inclusion by expanding financial options for Muslims and enabling their participation in the digital economy. The study also improves regulatory frameworks by providing suggestions for aligning cryptocurrencies with Islamic controls. Furthermore, it contributes to the academic literature by laying the groundwork for future research on cryptocurrencies within Islamic financial systems.

RESEARCH SCOPE AND LIMITATIONS

This study examines the relationship between cryptocurrencies and Islamic controls and scholars to propose a basic cryptocurrency model that adheres to Islamic finance principles. The scope of the research includes analyzing the compatibility of cryptocurrencies with Islamic standards, identifying challenges posed by

cryptocurrencies within Islamic controls, evaluating Islamic finance perspectives on cryptocurrencies, conducting a SWOT analysis from an Islamic finance perspective, and developing a Sharia-compliant cryptocurrency model. The study relies heavily on literature, fatwas, and opinions from Islamic scholars, as well as existing knowledge and practices in the field of cryptocurrencies and Islamic finance.

There are several limitations to the research that should be acknowledged. For starters, Islamic finance encompasses various interpretations of Islamic principles, and the researcher's understanding and interpretation may not be shared by all perspectives of the Islamic finance community. Second, because cryptocurrencies are constantly evolving, new developments and advancements may emerge, potentially influencing the findings and applicability of the proposed cryptocurrency model. Furthermore, while the model strives to follow Islamic finance principles, its applicability may vary depending on local regulations, cultural factors, and institutional requirements. The lack of comprehensive and up-to-date data on cryptocurrencies and Islamic finance may also limit the research, and the proposed model's practical implementation would necessitate careful consideration of relevant regulations and compliance requirements. Being aware of these limitations allows for a more nuanced interpretation and application of the research findings.

METHODOLOGY

The methodology used in this thesis is a mixed-methods approach that combines a SWOT analysis for cryptocurrencies and a comparison method for the Islamic finance perspective on cryptocurrencies. The SWOT analysis examines the strengths, weaknesses, opportunities, and threats associated with cryptocurrencies from the perspective of Islamic finance. The comparison method involves evaluating the various opinions of Islamic scholars and fatwas regarding the permissibility of cryptocurrencies, giving into consideration the justifications provided by each side. By combining these findings, the study hopes to propose a basic model for an Islamic cryptocurrency that adheres to Islamic principles. The methodology employs qualitative data analysis techniques and recognizes the limitations of available data and interpretations of Islamic principles. Overall, it provides a thorough examination of the relationship between

cryptocurrencies and Islamic controls and scholars, leading to the development of a proposed Islamic cryptocurrency model.

RESEARCH PROBLEM

The rise of cryptocurrencies presents challenges for Islamic controls and scholars, as there is a need to examine and comprehend the various aspects of cryptocurrencies from an Islamic perspective. The issue at hand is identifying and analyzing the implications of cryptocurrencies on Islamic regulations, ethical guidelines, and scholarly opinions to develop a comprehensive understanding of how these digital assets align with Islamic principles. However, The presence of certain aspects of cryptocurrencies may contradict Islamic controls and scholars' viewpoints, necessitating an examination of the areas where these digital assets deviate from Islamic principles. The issue is identifying and evaluating specific features or characteristics of cryptocurrencies that are not following Islamic regulations and scholarly opinions, to gain insights into the potential conflicts and limitations associated with integrating these assets into Islamic financial systems.

Understanding the effects of cryptocurrencies on Islamic controls and scholars is critical for several reasons. To begin, Islamic financial institutions and individuals are increasingly engaging with cryptocurrencies, but there is a need to ensure compliance with Islamic principles. By identifying the implications of cryptocurrencies, Islamic controls can be developed to regulate their use following ethical and religious guidelines. Furthermore, scholars play an important role in guiding permissible investments and financial transactions in Islam. Analyzing cryptocurrencies from an Islamic perspective allows scholars to provide informed opinions and rulings, ensuring that Muslims can participate in this emerging asset class without risking their religious beliefs.

This research aims to determine What are the aspects that must be available in cryptocurrencies to be accepted and compatible with Islamic finance controls?

INTRODUCTION

In a time when technology is changing quickly and more and more things are going digital, the idea of digital currency has become a big topic of interest for researchers, investors, policymakers, and people in general. People are paying a lot of attention to the rise of cryptocurrencies like Bitcoin, Ethereum, and others because they could change the way traditional financial systems work (Chowdhury & Razak, 2019, p. 1). At the same time, the field of Islamic finance has grown quickly and is now worth an estimated $1.7 trillion, which has sparked a lot of interest in the Middle East and the Far East (Pappas, 2020, p. 306). Even though Islamic finance is open to new technologies as long as they don't go against Shari'ah rules, it's hard to figure out how to include cryptocurrencies in its system.

Cryptocurrencies are decentralized digital currencies that use cryptography to make transactions safe and run on a technology called blockchain. Cryptocurrencies are not controlled by a central authority because they are decentralized. This makes them a unique challenge for Islamic finance. Sheikh Sajid Umar, a well-known Islamic scholar, says that the lack of a central authority to watch over cryptocurrency raises questions about whether it is allowed in Islam (Umar, 2021, p. 1). Islamic finance is based on Shari'ah principles, which come from the Qur'an and the Sunnah. In financial transactions, transparency, accountability, and doing the right thing are very important. Islamic finance and banking, as a vital component of the Islamic economy, has demonstrated its ability to maintain stability during financial crises. Its foundation in the real economy, avoidance of interest-based transactions, and aversion to risky assets like financial derivatives contribute to this stability. Islamic finance also offers various instruments such as Qardh-Al-Hasan, Zakat, Waqf, and Social Sukuk, which, combined with financial technology, can effectively address crises like the COVID-19 pandemic. However, the journey towards establishing Islamic economics as a comprehensive alternative economic system is still in its early stages. To achieve this goal, it is crucial to develop new concepts and models, starting from microeconomics, and go beyond the existing paradigm (Rai, 2022).

One of the main things that Islamic scholars worry about when it comes to cryptocurrencies is how much their prices change. Cryptocurrencies have been known to have large price swings, which makes them a very risky investment. Excessive

speculation, which is called Gharar in Islamic finance, is not allowed because it adds uncertainty and risk to transactions (Siswantoro, Rangga, and Mita, 2020; Rab, 2002). This part of cryptocurrency goes against the Islamic finance principles of stability and certainty.

Also, cryptocurrencies are hard to use in Islamic finance because they don't have real value and aren't backed by a recognized authority. Unlike fiat currencies, which are issued by central banks, cryptocurrencies get most of their value from how the market works. Sheikh Assim Al-Hakeem, a Saudi Islamic scholar, talks about the importance of backing and guaranteeing in Islamic finance by saying that "currencies that are not backed by any recognized authority or entity do not have intrinsic value and are not permissible" (Al-Hakeem, 2021).

Riba, or transactions with interest, are not allowed, which is another important part of Islamic finance. Since cryptocurrencies are decentralized and not tied to traditional banking systems, there are no transactions based on interest. From an Islamic point of view, this may seem good at first. Concerns have been raised, though, about how cryptocurrencies could be used to help launder money, fund illegal activities, or pay for terrorism. Some scholars aren't sure if cryptocurrency is allowed in Islamic finance (Habib, 2021) because of these worries and the fact that regulators don't keep an eye on it and it's not clear how it works.

When cryptocurrency and Islamic finance meet, it brings up important questions about how well they work together. Even though the world is interested in the benefits of cryptocurrencies, like fast and borderless transactions, we can't ignore the problems and conflicts with Islamic principles that come with them. The goal of this research article is to find out if cryptocurrency is allowed in Islamic finance, taking into account the legal, moral, and economic aspects. By looking at the arguments, fatwas, and scholarly opinions about cryptocurrency in Islamic finance, this research hopes to help people understand how this field is changing and give them tips on how to work with cryptocurrencies and Islamic finance together.

In conclusion, the rise of cryptocurrencies has led the Islamic finance community to talk and argue about whether or not they are compatible with Islamic law.

1. MONEY EVALUATION

1.1. Brief History of Money

Most societies in the past traded a commodity with some intrinsic value for money. Everybody had to be willing to accept the commodity as payment for goods or services for it to be widely accepted and serve as money. For instance, early forms of commodity money included tobacco in America, animal skins in Alaska, salt in Nigeria, cattle in East Africa, and shells in Thailand These items were not only used to pay for purchases, but also for debts, marriages, and fines (König, 2001). Even though commonplace items made excellent forms of money, they also had drawbacks. First, it was difficult to keep some of them stored for a long time. Second, it was challenging to determine their value with accuracy. Using these items to divide commodities into smaller amounts or units, or to plan financial activities for the future, presented challenges. The aforementioned factors led to the use of precious metals like gold and silver in some societies. Because they could be used for a variety of things, including transactions and the purchase of jewelry and dental fillings, they have been well-liked commodity currencies. For instance, around 4,500 years ago, people in Mesopotamia started using such metals. These metals were later employed in China, Ancient Egypt, and other places. Since they didn't yet have a fixed shape, they weren't quite coins at the time. In the ancient Lydian kingdom, the first coins were made about 2,700 years ago. They were constructed from a mix of silver and gold. These metals served as a means of exchange until a few hundred years ago, except in the most primitive societies. Since it was lighter and more durable than previous forms of money, this new metal money represented a significant advancement (König, 2001).

Planning for the future was made simpler by money's ability to be divided into different values. The economy was referred to as being on a gold standard when everyone only used gold as money. In the latter half of the nineteenth century, the Gold Standard was widely used. Despite the benefits of metallic money, these materials were still quite heavy, making it difficult to transport larger sums for purchases like land or homes. Furthermore, stealing them was simple. Additionally, the supply of precious metals was scarce in some nations. For example, they couldn't make coins with all of their resources. When governments debased them, gold and silver ran into other issues.

For instance, gold and silver served as the foundation for the commodity currency in ancient Rome. If emperors in the second and third centuries needed more money, they frequently decreased the amount of gold and silver in their coins (Mankiw, 1999). As a result, the Roman Empire experienced severe inflation at the end of the third century because only worthless coins were produced. These coins had no precious metal at all.

Payment forms have changed a lot over time. Before there was any form of currency, bartering was used to exchange resources or services. One of the biggest drawbacks of barter was a lack of a common standard of values such as a pricing system (Davies, 1994). As the number of commodities and their varieties increased, the barter system's flaws were exposed. Bartering is still presently used as a form of exchanging goods along with the presence of some sort of currency.

Before the invention of coinage and metal forms of money, many different objects were used as forms of money. Cattle, which includes cows, sheep, camels, and other livestock, are considered the oldest (9000-6000 B.C.) form of money since they were used as a unit of exchange (Davies, 1994). Grain and other agricultural products were also used as money during this period, and they continued to be used even during the existence of metal coins. The cowrie, an ovoid shell of a mollusk, comes in many different shapes and sizes and was used as a form of money for a greater length of time than any other object and was introduced around 1200 BC.

Some of the oldest societies used precious metals such as silver and gold as their form of payment. The oldest form of metal money is mentioned in written records from Mesopotamia during the third millennium B.C.E. (Surowiecki, 2012). Silver was the currency that was used by merchants during that period. Other societies such as Ancient Egypt and China also used these precious metals as well. Around 2,700 years ago in the 7th century BCE, a small kingdom named Lydia, located in what is now Turkey, introduced the standard of using metal coins as a form of currency (Surowiecki, 2012). They used coins that were a mixture of silver and gold. This form of payment would continue to be used for centuries to come. As money became more popular as a form of exchange, it increased the spread of markets. Governments quickly embraced hard currency to facilitate tax collection and use it to build military forces. The Roman empire and its rise relied on money as a tool to expand the empire and reduce trade costs. Emperors in the second and third centuries used less and less precious metals in their

coins to reduce cost and if they needed more funds. Eventually, the coins contained no precious metals and the coins were worthless. Meanwhile, in China, round coins were being used as currency (1200 BCE) but did not include precious metals. Coins continued to be the major currency until around the 6th century BCE when leather and hides were being used as currency in ancient Rome and eventually, coins were used in China by emperor Wudi in the 2nd century BCE as well. As the Roman empire fell in the 3rd-century BCE., the use of money declined throughout the world. The decline didn't last however, as in the 12th century, trade was being revived in Europe and a banking system was developed in Italy. The banks began the use of credit and debt, which was central to the economy as kingdoms borrowed from banks to finance their military and merchants borrowed to fund their trades.

During the 13th century in China, paper money was introduced as *chaos,* and it became the main form of currency throughout the country. In the 16th century in Europe, money was still dependent on how much gold and silver was available. A bill of exchange was invented to keep track of exchange transactions, and it laid the groundwork for the emergence of paper money in the West. These bills represented a quantity of gold that could be exchanged elsewhere for the real thing. In this system, when paper currency is issued by the government, it is known as fiat money, meaning that it must be accepted as the legal form of payment (König, 2001). In the 1600s, the rulers of Spain and Portugal began plundering their occupied colonies for precious metals which led to chaotic inflation and largely impacted the European economy and paper money lost its value (Surowiecki, 2012). The use of paper money continued spreading and made its way to the American colonies. Paper money also lost its value in these colonies during the American Revolutionary War when soldiers were being paid with bills that were over-printed and their collective value exceeded the available gold by a large margin. For this reason, paper money was prohibited in the U.S. until 1862, when the government began using paper money again and was very good at maintaining a balance between paper money and gold. However, as the economies and populations grew and improved, it led to deflation and prices dropped as there was no way to increase the money supply and economies eventually fell into recession in the 19th century. During World War I when governments needed more funds for their militaries, the gold standard system was no longer used as they began printing more money than they had gold. This has caused currencies today to become fiat currencies where money isn't tied

to anything other than believing that the paper is worth something due to it being issued by the government. This system gives complete control of the economy and how much money is being printed to the central banks. In the 20th century, the cheque was developed as a form of an IOU that can be used to complete transactions without the need to use the currency. However, the cheque system is much more scarcely used these days due to the development and advancement of technologies that allowed for the invention of credit and debit cards. The first credit was issued in 1950, and by 1995 about 90% of transactions in the U.S. were made electronically. Debit cards use electronic fund transfer systems (EFTS) to transfer funds from a bank to any other institution. Credit cards are similar and are paid for by booking the amount from the person's bank account. EFTS, credit cards, and debit cards helped reduce the cost of transactions and were what initiated the creation of digital money.

Today, digital money takes many different forms, and the latest form is cryptocurrency. Cryptocurrency was introduced in 2009, and the first form of cryptocurrency was Bitcoin. Bitcoin and other cryptocurrencies are a form of digital currency that is not issued by a central bank and is not overseen by anyone (Mukhopadhyay, 2016). The users are anonymous and are only identified by their digital wallet ID. The value of these cryptocurrencies is based on bidding similar to stocks and they are created through a process called mining. Mining involves computers solving complex equations to verify blocks of transactions and the computer that solves the equation receives a certain amount of the cryptocurrency. Digital money will likely continue to be the currency of the foreseeable future.

A key component of a free-market economy is monetary freedom, which calls for the value of money to be established through open-market transactions, just like the cost of any other good. Since e-money and electronic commerce depend on a flexible monetary system that should be supported by market competition, this principle also applies to them (Besson, 1999, p. 77). But there are also dangers associated with allowing different organizations to print their own money in a market where trade is unrestricted. One worry is the possibility that one private currency issuer, particularly big businesses engaged in e-commerce, could obtain excessive control over the entire economy or sizable portions of it. This brings up the problem of currency manipulation and monopolistic control over the supply of e-money, which governments may view as a threat (Besson, 1999, p. 77).

Effective risk management strategies must be put in place to reduce risks and guarantee the stability of digital money schemes. To prevent the creation of a single free-market clearinghouse that serves as a central bank, government regulation is required. Keynes, who recognized that governments play a crucial role in reducing uncertainty, previously emphasized the idea of government intervention to regulate market capitalism and stabilize the economy (Skidelsky, 2000, p. 112).

In conclusion, although market competition is necessary for a flexible monetary system and the success of e-money, it is also critical to address potential risks and ensure stability through governmental regulations and risk management practices (Besson, 1999, p. 77; Skidelsky, 2000, p. 112).

1.2. Definition of Money

Money can refer to a variety of things. In common speech, it has a variety of implications. For example, when someone says they have a lot of money, they usually indicate they are wealthy. Money, on the other hand, has a very definite connotation for economists. They define money as; anything that is usually accepted in payment for products and services or the repayment of debts (König, 2001).

The economy must fulfill the people's needs and serve as a vehicle for helping people to survive. The economy can fulfill its needs by providing goods and services and making them a stable value. The barter system allows the payment for a service to be made in exchange for another service or goods, but the problem is what if the worker does not need the service or goods on payday? What is the best way to please the service provider in such cases? Can he store the goods he received for payment for a long time? Goods and services must be exchanged between the people who demand those goods and services, and this is where money comes in. Simply, money acts as a solution to the barter system because it creates a form of platform between buyers and sellers without mutual claims. In the economy, money serves as a "vehicle" through which general prices for goods and services can be established, as well as standardized payments for services. This is important because it helps push the economy toward prosperity. After all, the suppliers of goods and services have a clear idea of how much money they will earn from providing specific goods and services (Aghalibayli, 2019).

Moreover, people have settled on gold as money for thousands of years, through an ongoing selection process. In other words, gold served as the standard money (Shostak, 2000). In today's monetary system, the core of the money supply is no longer gold, but coins and notes issued by the government and the central bank. Consequently, coins and notes constitute the standard money, known as cash, that is used for transactions. In other words, products and services are sold for cash. At any point in time, part of the stock of cash is stored and deposited in banks. Once an individual places his money in a bank, they are engaging in the economy (Shostak, 2000).

Masudul Choudhury defined money at its simplest: "in economic terms, money is what money does and what money does – in whatever form it takes – is to serve as a unit of account, a means of payment, and a store of value" (Choudhury, 2005). Agustín Carstens also outlines money in a few words; money is a common measure of economic value or a unit of account, that makes our lives easier (Carstens, 2019).

In other words, money is what people knew and accepted as a measure of value and mediator for exchanging commodities and services. Money is the thing that is generally accepted in circulation and is used as a medium of exchange and as a measure and repository of value that can also be used as a method of forward payments.

In addition, money is often defined by modern economists in terms of the three responsibilities it serves in an economy: Money is a store of value, which means it permits you to postpone consumption. It's a unit of account, which means you may use it to evaluate different goods without having to compare them. Finally, it is a medium of exchange that is a simple and efficient way for us, as well as others, to trade goods and services. All these functions are related to buying and selling, and that is how the world today thinks of money, to the point where any other way of thinking about money appears strange. Money, on the other hand, served a different purpose in tribal and other "primitive" economies, serving as a social lubricant rather than a store of value or means of exchange (Surowiecki, 2012).

1.3. Function of Money

1.3.1. Medium of Exchange

Money serves as a medium of exchange that greatly simplifies economic transactions. The ease and speed with which money can be turned into other things – products or services – is referred to as money liquidity. This is what makes money the most liquid asset, according to Keynes (König, S. 2001).

Money, whether in the form of cash or cheques, is a means of exchange since it is used to purchase goods and services in our economy. We would live in a barter economy if we didn't have a means of exchange, where products and services were exchanged directly for other commodities and services. People who rely on barter must meet the double coincidence of wants. People must find someone who has a good or service they need and likewise wants the good or service they give to trade. The barter economy system becomes too complicated to be realized in a society with millions of people and millions of different goods and services (König, S. 2001).

The barter system is a suitable system when there is a limited quantity of goods and services, even if it has certain disadvantages such as transportation problems, difficulty in payment or late payment, demand-matching, and cannot easily accumulate wealth. These restrictions have given rise to the need for a common good, a commodity, or a unit for barter and price. It must have certain properties to be accepted as a medium of exchange. It must be easily identified and handled using readily available technology, inert to prevent deterioration, and rotting, easy to store and collect, and finally rare enough to not be abused by the community (Choudhury, 2005).

1.3.2. Unit of Account

Money also serves as a unit of account, which is its second function. This allows prices to be stated and debts to be noted in standardized terms. It's also known as the unit of measurement for monetary transactions. All prices, that is, the values of things and services, can be expressed in terms of money units. The United States Dollar, for example, serves as the unit of account (König, S. 2001).

Any transaction people want to make is done by reducing payments to simple currencies that all parties can understand. For example, if someone wants to buy a car in modern times, they should think about how much money they must spend in dollars or any other currency. If money were not a measure of value, the person who wanted to

buy a car would have to think of the number of cattle, corn, wheat, or any other commodity he would need to exchange for the car. It's a way to standardize prices and let people trade with confidence in the economic system (Choudhury, 2005).

1.3.3. Store of Value

Finally, money serves as a store of value. This refers to the transfer of purchasing power from the present to the future. A person may choose to save a portion of the money gained by bartering his or her labor to spend it later. The money at this point becomes a store of value.

This means that you can use your money to store your assets, buy things in the future and make payments instantly at any time. For example, if someone has potatoes and wants to keep them for future payments, they can rot over time, so they don't store value, and they become worthless in a short period. This differs money from many other commodities (Choudhury, 2005).

Money, according to Keynes, is "the perfect store of value, the only asset that enjoys perfect liquidity..." (Hicks, 1989, p.42) However, money does not perform effectively as a store of value during periods of inflation, when the overall level of prices rises. Thus, Keynes' thesis was far more valid when there was no inflation or when inflation was extremely low. Other assets act as greater stores of value than money, such as stocks, bonds, land, houses, art, or jewelry, because many of these offer benefits over money. The fact that they pay the owner larger interest rates than money is one of them (König, S. 2001).

1.4. The Barter system

Barter has long been a method for people to fulfill their needs and desires because it involves exchanging goods without the use of money. It includes a range of exchanges, such as gift-giving, ceremonial exchanges, and market exchanges where the emphasis is on the items being traded and the terms of the deal (Humphrey, 1985, pp. 48–50; Dalton, 1982, pp. 181–182; Chapman, 1980, p. 35). It's important to note that giving gifts to build relationships, like at Christmas or religious celebrations, does not qualify as barter. According to Humphrey (1985, pp. 48–50; Dalton (1982, pp. 181–182); Chapman (1980, p. 35), money, if it is present in a barter transaction, can only take the form of the item being exchanged. It cannot act as a medium of exchange.

Contrary to popular belief, monetary systems coexisted alongside the barter system, which is not the origin of money. Barter exchanges were occasionally used in societies to fill the gap left by the limited availability of money (Humphrey, 1985, pp. 48–49). The idea that a barter economy predominated or that money developed from it is not supported by ethnographic research. Adam Smith, Menger, Jevons, and other traditional economists, as well as more recent economists like Clower, have put forth an evolutionary theory in which barter is seen as a feature of prehistoric economies that was later replaced by more effective monetary exchange (Humphrey, 1985, p. 49). In barter, people had to find a trading partner who not only had the desired goods but also wanted their goods, as Jevons (1875) argued (Banerjee & Maskin, 1996, p. 956). This presented a problem of the double coincidence of wants, which Jevons (1875) claimed is solved by money. By highlighting the function of credit systems in barter economies, Einzig (1948) added support for the monetization theory (Einzig, 1948, as cited by Chapman, 1980, pp. 52–53). Credit systems were less necessary after the invention of primitive money. The transition from barter to commodity money, according to Jones (1976) and Kiyotaki and Wright (1989), happened as people began to value group exchange over individual interests (Ritter, 1995, p. 146).

But it raises issues that barter is still used in contemporary economies where money is present. As an illustration, Guriev and Ickes (1999) found that despite the availability of cash payments, Russian businesses continued to conduct barter transactions. They noted that even exporters and foreign-owned businesses were now engaging in barter, which had become pervasive in the modern Russian economy.

According to Guriev and Ickes (2000, pp. 158–160), there are several important reasons why barter has become more popular in this situation, including tax evasion motives.

The practice of barter has existed for a while and continues today alongside monetary systems. Barter has been used in societies where there has been a lack of money, despite not being the source of money. There are several reasons why barter continues to exist in contemporary economies like Russia, including tax evasion (Sanneh, 2023).

In summary, barter is neither the cause of money nor is it rendered obsolete by the existence of money. Because of people's preferences, it existed in societies with and without money, with money but not enough, and in societies with a recognized currency. It is not only a prehistoric system; it is also a modern phenomenon that people use to manage their affairs for various reasons. Additionally, the presence of money does not necessarily indicate the existence of a medium of exchange because no outside standard is used to compare the worth of different items; rather, parties decide whether or not the items are of equal value. As a result, money itself may be a traded good.

1.5. Commodity Money

The commodity monetary system is also known as representational money since central banks in it issue their currencies as a representation of a physical good, typically gold or silver, at a fixed rate. It has been described as an object with an intrinsic value determined by socially necessary abstract labor that is innately incorporated into the process of production under the capitalist condition of production (Lapavitsas, 2000). Owners of the currency are free to exchange it at any time for the genuine backing commodity. The issue of the money supply was partially resolved by commodity-backed money, but central banks are still unable to freely print money, even when there is an economic need for it. Fixing a currency to a somewhat stable-priced commodity prevents depreciation of the currency by restricting the money supply, which in turn leads to speculatively rising asset prices when there is a significant increase in credit. An example of regression is what occurred in the U.S. in 1929 when the economy collapsed, and demand fell. Even though the value of currencies backed by commodities is generally stable, there are still some fluctuations due to changes in the prices of the commodities that support those currencies as a result of speculation and the business

decisions of the companies that produce those commodities. These difficulties drive the governments to switch to a system called the fiat currency, where the currency's value is determined by the economic might and dependability of the governments rather than a commodity.

Commodity money serves as a gauge of the worth of other goods. It is described as a product that is beneficial to people in a variety of other ways and is naturally scarce in supply, but which is also used as a medium of exchange because it commands an equilibrium value that is positive and equal to its marginal cost of production (Selgin, 2015). Another way that commodity money has been described is that it is a good that is accepted in commerce but not one that is intended to be consumed or used in production (Kiyotaki and Wright, 1989). To put it another way, the commodity is recognized as a medium of trade since the parties involved are confident they won't have any trouble exchanging it for goods they will eventually need (Cuadras-Morato, 1994). Finally, commodity money has been defined as an asset with a readily verifiable attribute that agents exchange for commodities to move between them (King & Plosser, 1986).

Due to the amount of labor required to obtain a specific amount of gold, rather than the demand or supply for these commodities, gold has a higher value than silver. To put it another way, if gold is 15 times more expensive than silver, it is because it takes 15 times as much labor to produce a certain amount of metal (Ricardo, 1951). Although commodity money has intrinsic value, this is not relevant in the development of production prices because capital is constantly moving in search of higher profit. Prices can therefore be determined in terms of commodity money or valueless money (Lapavitsas, 2000).

Although gold and silver were common forms of commodity money, other goods such as cattle, salt, and copper, among others, served as mediums of exchange in ancient times. The mina, a quantity equal to 10,800 grains of wheat, served as the first unit of currency in ancient Babylonia (Keynes, 1982). Weight units such as this were carried over into the monetary units that ultimately became the basis for credit money and commodity money. The fact that the stater and shekel, the standard coinage of Greece and 22 Babylonia, respectively, had weights equivalent to grains, indicating that the unit of account came before the coins, is noteworthy.

Animal skins in Alaska, salt in Nigeria, cattle in East Africa, tobacco in America, and shells in Thailand were a few early examples of commodity money. These items were used to pay for debts, marriages, and fines in addition to purchasing products. Even though commonplace items made excellent forms of money, they were not without flaws. Long-term storage of some of them was problematic, and it was difficult to determine their value accurately. Problems developed when dividing commodities into smaller amounts or units or when using these objects to plan financial operations for the future. Some societies began to employ precious metals like gold and silver for the aforementioned reasons. Because they might be used for a variety of things in addition to transactions such as jewelry or dental fillings, commodity currencies became very popular. Precious metals were first used by people in Mesopotamia about 4,500 years ago. Later, these metals were employed in China, Ancient Egypt, among other places. Because they didn't have a set shape at the time, they weren't quite coins yet. The first coins were created in Lydia's ancient kingdom about 2,700 years ago, and they were constructed from a blend of silver and gold (Selgin, 2015).

Precious metals have become the agent that can more successfully carry out the function of universal money commodity than other commodities because they have the universal function of general equivalency. This is primarily because of their desirable features of durability, transferability, and ease of divisibility. With inherent qualities such as mobility, verifiability, and storability, they have been naturally chosen to serve as money to fulfill the role of medium of exchange. It is important to keep in mind that the intrinsic feature of verifiability weighs less than other properties given that various commodities have been used as money throughout history while being only partially verifiable (Li, 1995). A good might be regarded as money if it can be utilized as a direct trading good for other goods in the economy. Furthermore, a medium of exchange must be the one that is most likely to be sold (Alvarez, 2004).

1.6. Credit Money

Credit money is another type of currency that is used in economies today. Due to the growth of the banking system under the direction of a central bank, bank deposits have taken the position of central currency. The ability of money to serve as a means of

payment gives rise to credit money. Products are sold in exchange for a promise to pay, or credit, as opposed to receiving payment right away. Therefore, in this instance, trade invoices serve as a kind of payment.

As mentioned earlier, commodity money, such as coins made of gold, silver, or copper, could become less valuable over time through degradation. Credit money, however, could not depreciate about the money of account if the debtor did not fail to fulfill his or her credit. For example, once it has been determined that twenty coined silver shillings of the highest purity shall weigh one pound, any decrease in weight or purity will devalue the shilling but this will not affect the value of the money of account or credit money denominated in the unit of the account.

If conversion attempts are made, a credit money economy built on a reserve of commodity money fails. However, a "run" on credit money that cannot be stopped by liquidation can result from waning confidence. Instead, a reliable person or organization would work to allay the concerns of credit money holders by attesting to the issuer's financial stability. If trust could not be rebuilt, the issuer would default, and the value of the credit money would be lost. This might result in more runs, a breakdown into a financial panic, and a deflation of debt.

When credit money is based on the money of account, its value can only decrease if it declines in value relative to the money of account. It would not matter if credit money was valued in commodity money or the unit of account in the absence of debasement. However, as was previously said, coin debasement became widespread in medieval Europe, adding yet another way for credit money to lose value because any credit money denominated in the debased coin would lose value in comparison to money of account. A debtor whose obligations were in account currency would find it more challenging to make payments in terms of a depreciated coin, increasing the risk that they would default. A system based on a stable coin would favor creditors, while a system based on a deteriorating coin favored debtors and entrepreneurs (Cipolla, 1956). Throughout time, many different countries and empires attempted to establish a gold standard of money to prevent the debasement of commodity money, such as in Europe, even in Roman times (Polanyi 1968).

Credit money could then be denominated in commodity money and made convertible into commodity money. The commodity money would be made convertible

into gold at a fixed rate of exchange as established by the money of account. There is no longer a distinction between credit money denominated in money of account and credit money denominated in terms of commodity money thanks to the introduction of the gold standard. When there is a devaluation, the value of the unit of account, credit money, and commodity money all decrease relative to but not independently of one another.

The expandability of credit money is one of its distinctive qualities. Banks use a fractional reserve system, in which they are only obligated to hold a portion of the deposited funds as reserves, to produce credit money. The remaining sum can then be lent out, effectively increasing the amount of money in the economy. A crucial factor for the rise of the total money supply and economic activity is this increase in credit money.

Credit money is the most common type of currency in contemporary economies. It can be found in the form of electronic money and bank deposits. A bank creates new money in the form of a deposit in the borrower's account when it extends a loan or extends credit to a person or a business. This deposit is regarded as credit money and is usable as a means of exchange. Beyond the physical reserves that the banking sector now holds, credit money enables the increase of the money supply. This growth has been made possible by the fractional reserve banking system, in which banks are only obligated to hold a portion of their deposits as reserves and are free to lend the rest.

1.7. Metallic Money

Before governments stamped metals to assure their weight and purity, metallic money was used as a medium of exchange for centuries. Metal money has been around for many centuries, however, its exact origins are difficult to pinpoint. Different types of metal money were already in use before coined money was introduced. For instance, silver has already established itself as a widely accepted medium of exchange thanks to its qualities of homogeneity, portability, durability, and ease of storage (Law, 1966). Precious metals were utilized in ancient commerce in places like Egypt, Asia Minor, and Sicily, while other metals like platinum, tin, and iron were sporadically used but only for short periods. Gold, silver, and copper became the main types of metal money in areas rich in these metals. In contrast to substitutes like crystal, jewels, hard stones, and porcelain, Galiani claimed that gold and silver were accepted as money because they

naturally contained the properties required for monetary reasons (Cesarano, 2014). When precious metals were first used as currency, transactions required the metal pieces to be weighed. The invention of currency in Asia Minor in 8 BC, however, reduced this problem (Toppan, 1884).

According to historical study, analogous developments in East Asia and Greece in the sixth century BC can be linked to the invention of gold coins as a form of metallic money. The first electrum coins are thought to have been produced by the Lydian King Alyattes approximately 600 BC, and the first gold coins are thought to have been made by the last Lydian King, Croesus, in the sixth century BC, making Lydia a pioneer in coin production (Taskinsoy, 2019). Up to the 18th century, silver coins were still frequently used in both Europe and America. Additionally, until 1971, some kind of metallic currency was still formally acknowledged. The International Monetary Fund (IMF) members' currencies were convertible into US dollars through the Bretton Woods agreements of 1944, and the US dollar was also convertible into gold at a set rate of 35 US dollars per ounce. Due to requests from Germany and France to exchange their excess US dollars for their currencies or gold, the US administration terminated the Bretton Woods agreements in 1971, bringing an end to the gold standard and ushering in the age of fiat currencies (Taskinsoy, 2019).

Metal money has been a common form of payment throughout history and has been essential to trade and commerce. However, the use of metallic currency in daily transactions has decreased as a result of the advancement of contemporary financial systems and the popularity of paper money. Today, the majority of nations have switched to fiat money systems, in which the value of the currency is not based on an actual tangible good. However, metallic money is still valuable as a collectible, an investment, and for some specialized uses. They also continue to be used in the production of jewelry and other upscale items, further demonstrating the value of metallic money in the world financial system.

1.8. Fiat Money

In the 16th and 17th centuries in England, banks developed as a result of the drawbacks of gold and silver. There, merchants would store their gold in exchange for a statement detailing their deposit amount. When the merchants wanted to purchase something, this statement could be signed over to another person. Paper money, which

are pieces of paper that serve as a medium of exchange, as a result, emerged. Paper money was initially promised to be exchangeable for a sufficient amount of coins or precious metal. In the majority of nations, this system has developed into paper money that is issued by decree of the government (also known as "fiat"). This calls for the acceptance of this currency as a legal tender (Schenk, 1997–8). For instance, the face value of today's coins is greater than the value of the metal, giving them only a token value. Fiat currency is valued according to the perceived legitimacy and creditworthiness of the issuer. In most modern societies, fiat money is the norm. The central bank's fiat authority is used to create and administer national currencies. (Central banks are organizations that manage the nation's money supply.) Fiat currencies are stable, dependable, and effective if the monetary authorities are competent and honest (König, 2001).

Governments started to compete by issuing fiat money through their central banks or treasuries. Private banks were allowed to store this governmental (or quasi-governmental) fiat money as reserves, which caused the fractional reserve system to see successive expansions of bank deposits. Governments' capacity to borrow or create fiat money has historically been severely curtailed. Due in part to the numerous state defaults, people and institutions were hesitant to absorb government liabilities. Additionally, governments have attempted to print "fiat" coins, which are those with a precious metal content that is less than the value promised in terms of the unit of account (Wray, 1990). However, individuals who got the coin were always in danger of the King declaring a lesser value for the fiat coins at a later time in terms of the unit of account. Government money would typically not circulate unless it took the form of metal money, with its value based on the amount of embodied precious metal. Experience showed that governments regularly tried to achieve purchasing power in this manner. The government guaranteed that these coins could be redeemed for gold in the future by issuing them. However, individuals who got the coin were always in danger of the King declaring a lesser value for the fiat coins at a later time in terms of the unit of account (Stevenson,1991).

The Bank of England was established to give the government purchasing power by buying its debt and printing currency. It received several monopoly rights and other benefits in exchange, including the exclusive ability to issue notes in London. Because the Bank of England could purchase government debt and its notes (denominated in the

money of account) would act as fiat money, the government gained enormous purchasing power. Bank of England liabilities were used as the main reserve and at the top of the debt pyramid in this "mono-reserve" structure. Today, capitalist nations worldwide use this system (Wray, 1990).

"Fiat" money from the central bank is an IOU or debt with an account currency value. Before central banks were established, there have been instances of government fiat money in use, such as in a few Italian city-states. The emergence of representative democracy, which allowed a government to issue fiat money expressing a promise to convert paper or coin to gold, was the most significant development that provided governments the authority to issue fiat money. Furthermore, full-bodied commodity money is a type of special-purpose currency issued by governments that lack the creditworthiness necessary for their liabilities to be recognized (Wray, 1993). Despite having no inherent value, fiat currencies are valued because of the trust that people have in the government that issues them. The Latin root of the word "fiat" means "let it be done." For instance, as stated in the currency itself, the United States Dollar is regarded as a legal tender for all debts (Aghalibayli, 2019).

Fiat currency is any legal tender that is issued and designated by a reliable central authority, such as the government of a sovereign state, and that is supported by legislation to ensure that people voluntarily accept it in exchange for goods and services, according to the European Central Bank (European Central Bank, 2015, as cited by (Lutz, 2018, p. 6). Fiat currency, in other terms, is money that the state recognizes as having legal status but that is unrelated to the price of a good like gold or another precious metal. As a result, a fiat currency's value is set by the government, and it has government support and approval for its legal tender status (Alghamdi, & Beloff, 2015, as cited by Naheem, 2018). Fiat currency, therefore, lacks intrinsic worth or depreciates because it only relies on the public's confidence in the competence of their government to direct its course to achieve monetary stability (Islam, Nor, Al-Shaikhli, & Mohammad, 2018). To put it another way, the value of fiat currency is determined by the level of confidence and accountability people have in the government and central bank that created and maintained it to properly manage it and prevent economic instability (Jin, Zhu, Yang, & Wang, 2021).

The Chinese Tang Dynasty, which ruled from AD 618 to 907, was the first to print paper money. However, due to hyperinflation, the Dynasty decided to completely abolish paper money in 1455. The Ilkhan dynasty attempted to introduce paper money to its conquered kingdoms of Bagdad and Iran in the 13th century, but their efforts were unsuccessful (Tullock, 1957, p. 395). People accept an item as a medium of exchange when they recognize its value, claims Cermak (2017). Since fiat currency lacks solid backing, its value rests on public confidence in the central bank to refrain from rapidly expanding its supply (Cermak, 2017, p. 12).

Due to price inflation, fiat currency's value is continuously falling, giving bitcoin a deflationary advantage (Hong, Park, & Yu, 2018, p. 23). After winning the American Revolutionary War, the United States adopted the dollar as the basic unit of its national currency in 1792. Despite the dollar's hegemony as the primary reserve currency, the dollar remained connected to the gold standard until 1971, when US President Richard Nixon terminated the connection to gold (Taskinsoy, 2019, p. 10).

1.9. Digital Money

The development of computer technologies and the expansion of electronic commerce have led to the emergence of digital money, also referred to as electronic money or e-money. Internet-enabled electronic commerce has revolutionized business operations, necessitating the development of more effective payment options (König, 2001).

Due to its uncontrolled and decentralized character, digital currency, like bitcoin, has gained attention as a potential substitute for fiat currency. Digital currency is any type of money or medium of exchange that is electronic and has a distributed ledger and a decentralized payment system, according to (Barrdear & Kumhoff, 2016). The "distributed ledger," which employs peer-to-peer networking and cryptography, is regarded as the core innovation of digital currency since it makes it possible for a payment system to be completely decentralized and without the involvement of intermediaries like banks (Ali, Barrdear, Clews, & Southgate, 2014). Furthermore, digital money is an internet-based medium of exchange based on advanced technology that exhibits the characteristics of currencies but allows for immediate transaction execution or faster transaction speed as well as the transfer of ownership across

international borders (Hong et al., 2018). Digital currencies, in contrast to paper money, are viewed as intangible assets or digital commodities rather than as a claim to someone.

Although credit cards have been widely used as digital payment methods, their high transaction costs may make them unsuitable for smaller transactions. Electronic money was created as a remedy. E-money is a term used to describe a digital payment message that works as a store of value or a medium of exchange. It is always pre-paid, virtual, and impersonal. E-money's value is assigned to a coded digital message that is stored on a computer system or smart card chip, and the issuer guarantees a set reimbursement value (Besson, 1999).

E-money systems come in a variety of forms, including digital checks, credit card chips, and electronic coins. Many of these systems continue to denominate values in national currency. Email can be used to send electronic cheques, such as NetChequeTM, which are appropriate for small payments. For secure transactions like paying for transportation, smart cards, or digital wallets, are preferred because they have a small computer chip attached. For instance, MONDEXTM is a plastic card that can store different currencies (König, 2001).

Virtual money and cryptocurrency are the two categories that make up digital currencies. Due to their reliance on or use of techniques from the science of cryptography to reach consensus, the majority of digital currencies are cryptocurrencies. To prevent any centralized control and lower the amount of trust that players must place in any third party, digital currency was developed (Hong, Park, & Yu, 2018; Ali, Barrdear, Clews, & Southgate, 2014). Digital currencies are regarded as an asset class for financial investments as well as a means of exchange. However, because of their global nature, rising and developed economies will be susceptible to "digital dollarization," in which the currency of a digital platform replaces that of a nation rather than that of another.

It is crucial to note that recently, central banks including the Bank of England, Bank of Russia, People's Bank of China, Bank of Canada, Reserve Bank of Australia, De Nederlandsche Bank, and others have thought about the possibility of creating their own central bank-issued digital currency based on distributed ledger technology to handle issues about the dwindling role of central banks in the face of growing public interest in decentralized currencies and a pa Governments view these privately created

digital currencies as a foreign currency whose supply cannot be managed by the central bank, which is one of the reasons behind this. Additionally, they aid in the facilitation of other crimes like tax evasion, the selling of illegal substances, kidnapping and extortion, and money laundering. Policymakers frequently express interest in the innovation it contains, even though they do not need such a payment system (Hong, Park, & Yu, 2018; Barrdear & Kumhof, 2016).

E-money has the benefit of anonymity, allowing users to freely use it without disclosing their identity to the bank. E-money needs to have properties similar to those of traditional money, such as monetary value backed by physical cash and widespread acceptance, to replace it as a medium of exchange. E-money businesses are appealing because banks effectively receive interest-free loans from customers since they do not charge interest on digital currency balances. Paper money is becoming more expensive due to rising production costs brought on by security requirements. There is a chance that the use of central bank-issued money will decline or even disappear if e-money schemes can reduce transaction and handling costs while maintaining high-security standards. From the standpoint of central banks, digital currency replaces conventional money that is printed by governments (König, 2001).

2. CRYPTOCURRENCY

2.1. Definition of Cryptocurrency

Cryptocurrencies are a type of digital currency that resembles an intangible good. It is regarded as one of the most significant technological breakthroughs in recent memory because it quickly gained widespread attention. It is a digital asset designed to be used as a medium of exchange (store of value) that uses cryptography to secure its transactions. It is a digital currency that uses blockchain technology and cryptography to protect the details of exchanges and transactions made on a digital platform, to put it another way. Being independent of any server or authority is a key characteristic of cryptocurrencies. Since it is a digital cash system based on peer-to-peer networking, where files are shared from one peer to another without the need for a third party or server to control the platform, it is safe from the grasp of authorities. In other words, cryptocurrency is essentially a database with a set number of entries that cannot be changed unless certain requirements are met. Cryptocurrency can also be defined as a form of electronic money that is created and stored in a blockchain without having any intrinsic value. It uses cryptographic encryption techniques to regulate the creation of currency and authenticate money transfers. It depends on an entirely decentralized network, making it impossible for any central bank to control its supply (Milutinović, 2018). The control of this decentralized structure is carried out by blockchain transaction databases (Çarkacıoğlu, 2016).

A cryptocurrency has no physical form because it is a virtual coin. The only evidence of ownership of a cryptocurrency is a blockchain transaction that has been verified. The blockchain is a public record, also known as an electronic ledger. For instance, those who own cryptocurrencies want to purchase goods from merchants who accept them as payment. The currency is transferred via the public ledger system as opposed to being handled by a bank. When a business decides to introduce new products and raises the necessary funds to do so, a new cryptocurrency is typically launched. The business launches new coins or tokens made through the initial coin offering as well as produces its virtual currency. Different names have been given to the various coin or token types that have been produced. Bitcoin was the first cryptocurrency. Other than serving as a medium of exchange (or a store of value), bitcoin serves no other purpose

or function. Cryptocurrency is typically organized according to a predetermined protocol that specifies how many coins can be produced, how they are produced, and how ledger integrity is safeguarded. Their effectiveness will influence consumer confidence in digital equivalence to governmental regulations and laws that support fiat money. Blockchains for cryptocurrencies are typically designed to make it difficult or impossible to change the operating protocol. When a cryptocurrency is available for purchase, there are many options. It can be purchased through exchanges; some people choose to accept it because their employer permits them to do so; some merchants accept cryptocurrency as payment for their goods and services; or individuals or groups who maintain the blockchain for crypto currency are typically rewarded (Siswantoro, 2020).

Cryptocurrency has been defined in a few other ways as well. According to a different definition, cryptocurrencies are comparable to previously in-use coins and banknotes but differ in that they allow for the exchange of digital information while utilizing specific cryptography principles that protect financial transactions from fraud and offer control mechanisms (Kesebir & Günceler, 2019). Another definition made by (Rosiah, 2020), cryptocurrency is an internet-based medium of exchange that uses cryptographic functions to carry out financial transactions. Lastly, according to (Yoo et al., 2020), cryptocurrency is a worldwide digital payment system that performs its functions online.

2.2. History and inception of cryptocurrency

The history of cryptocurrencies goes back to 1982 when David Shaum was the first to invent Protected Virtual Currencies. He published a study on Blind Signatures, which allowed information and funds to be sent without disclosure of the sender's identity (Chaum, 1998). In the 1990s, Shaum founded DigiCash, which used his blind signature invention to create virtual currency. In 1996, the Gold Silver Reserve Company established the E-gold system, which relied on precious metals and issued its currency on the Internet. However, after the USA Patriot Act in 2015, the company faced problems and accused its founders, leading to the suspension of the electronic gold system (Wisniewska, 2016). In 1996, the National Security Agency published a working paper titled “How to Make a Mint: the cryptography of anonymous electronic cash.” This article describes the electronic money system (Lawand, 1997).

The year 2007-2008 saw a recession at its highest form, with the mortgage crisis and debt crisis leading to a mass reduction in employment opportunities and an increase in debt crises. Cryptocurrencies emerged in October 2008, with online currencies such as B-Money and BitGold being secured using encryption. Satoshi Nakamoto registered the domain name Bitcoin.org and his whitepaper with the title “Bitcoin: Peer-to-Peer Electronic Cash System” in August 2008 (Rufng and Pedro 2017). The author had taken ideas from existing cryptocurrencies with new additions, such as no involvement of a third party, the consensus algorithms like Proof of Work, usage of hash codes, and formation of block chains. The idea of a blockchain heightened the features of a cryptocurrency and it was touted to work without trust (Yadav et al., 2020).

Bitcoin began block development in January 2009, which is also the year that bitcoin was created. Beginning with block 0 of the network, Nakamoto introduced bitcoins, with the first block's entry earning 50 bitcoins as the reward (Yadav et al., 2020).

Since bitcoin was only ever mined, it was impossible to add monetary value to it when the market value of bitcoin was announced in the year 2010. Multiple miners collaborated to add the block in 2010, and this idea was known as a mining pool. As a result, in November 2010 (Sun SF 2017), the market capitalization of bitcoin exceeded $1 million. Additionally, a bitcoin bug that raised serious security issues was discovered. Between 2011 and 2014, cryptocurrency exchanges and new altcoins emerged. These altcoins followed the same principles of encryption and decentralization as bitcoin. They were faster and had more benefits, such as anonymity, than bitcoin. Between the years of 2014 to 2016, Mt.Gox and BitPay, two cryptocurrency exchanges, were launched. Aside from this, some other launches were made, including those for Ethereum, Coinbase, and the Bitcoin fork. The rate of network was constantly increasing. As a result of the rise in bitcoin's value to $14 billion, governments began to accept it as real money for transactions (Yadav et al., 2020).

The cryptocurrency market was fluctuating and unstable in 2017 due to the number of investors and traders flooding the market. Its market capital had reached a record high and was increasing by 100%. By the end of the year, however, the boom had ended as a result of a sharp decline in the price of bitcoin and other cryptocurrencies. Due to a bare market, new regulations, and rising adoption, cryptocurrency prices fell

by 80% in 2018. According to Biswas and Muthukkumarasamy (2016), the price of bitcoin dropped to $4000 and the price of Ethereum was below $100. However, small-scale investors and businesses continued to invest in cryptocurrencies in the hopes that they will recover. To control the potential of the currency, new regulations were put into place. In 2019, even though the value of bitcoin had fallen dramatically, it was still present on the market in some form. Many new investors began to recognize the potential of cryptocurrencies because of their decreased value (Yadav et al., 2020).

2.3. BITCOIN

There is a perception that a digital currency will eventually replace the current global system of fiat money issued by central banks as a result of the development of the internet. A portion of the population now believes more strongly than before the arrival of bitcoin that a decentralized, borderless cryptocurrency will eventually replace the conventional fiat currency. In contrast to conventional payment methods, bitcoin is a virtual currency designed for anonymous transactions that are completely independent of banks and governments (Segendorf, 2014). It is a decentralized payment system and virtual currency that uses cryptographic rules but has no intrinsic value or legal support (Rahman, 2018). Bitcoin is also an algorithm currency with a deterministic supply that is unaffected by manipulation by governments or other central authorities and a growth rate tied to the rigidity of mathematics (Yermack, 2015). The use of cryptography in Bitcoin helps to maintain user privacy because hashed wallet addresses rather than personally identifiable information are stored.

Satoshi Nakamoto published a whitepaper detailing a peer-to-peer digital currency system on October 31, 2008, in response to the horrors of the 2008 financial crisis. Transactions would be recorded on a blockchain and validated by a decentralized user network. Then, on January 3rd, 2009, Nakamoto created the first block on the blockchain for bitcoin, ushering in a phenomenon that is currently developing (Griffin & Shams, 2020). Bitcoin has received more adoption and attention than any other digital currency up to this point due to its first-mover advantage, low transaction costs, anonymity, and decentralized, autonomous system (Gervais et al.,2014). The final bitcoin is expected to be released by the year 2140, with a total of 21 million units allowed for release. Although this limit is thought of as a step towards combating

inflation, some economists contend that it may have long-term economic disadvantages because, once it replaces fiat currencies and takes the place of the global reserve currency, it will exert a deflationary force on the economy. After all, once the limit is reached, there won't be an increase in the money supply to accommodate economic growth (Yermack, 2015).

A wallet is a piece of software that can be put on a computer or smart device and is used to store Bitcoins. It works by having peers send each other encrypted messages using public and private keys that are checked by the network. The unique public-private key pair that goes with each user's bitcoin address is used to move bitcoin coins (BTC) from one address to another (Segendorf, 2014). Miners verify a transaction by checking the hash computation to make sure the resulting block is correct. Once they are satisfied, they add the block to the list of accepted blocks, which proves the BTC is valid. The way Bitcoin keeps public records of every transaction in the network was a unique way to solve the double spending problem (Gervais et al.,2014).

By putting a transaction in a block and letting the whole network know about it, a fraudulent user can't give the same coin to two different people (Gervais et al.,2014). Also, compared to the traditional currency system, bitcoin has many advantages, such as low transaction costs, anonymity, shorter transaction times, and a way to stop the move to centralize money services. But it has some problems, like being volatile and requiring more computer knowledge to use. It's also hard to keep up with wallets, and if you lose your private key, you can't spend your coins (Yermack, 2015). Lastly, it's important to look more closely at bitcoin's volatility, which is seen by many as the biggest problem with the currency.

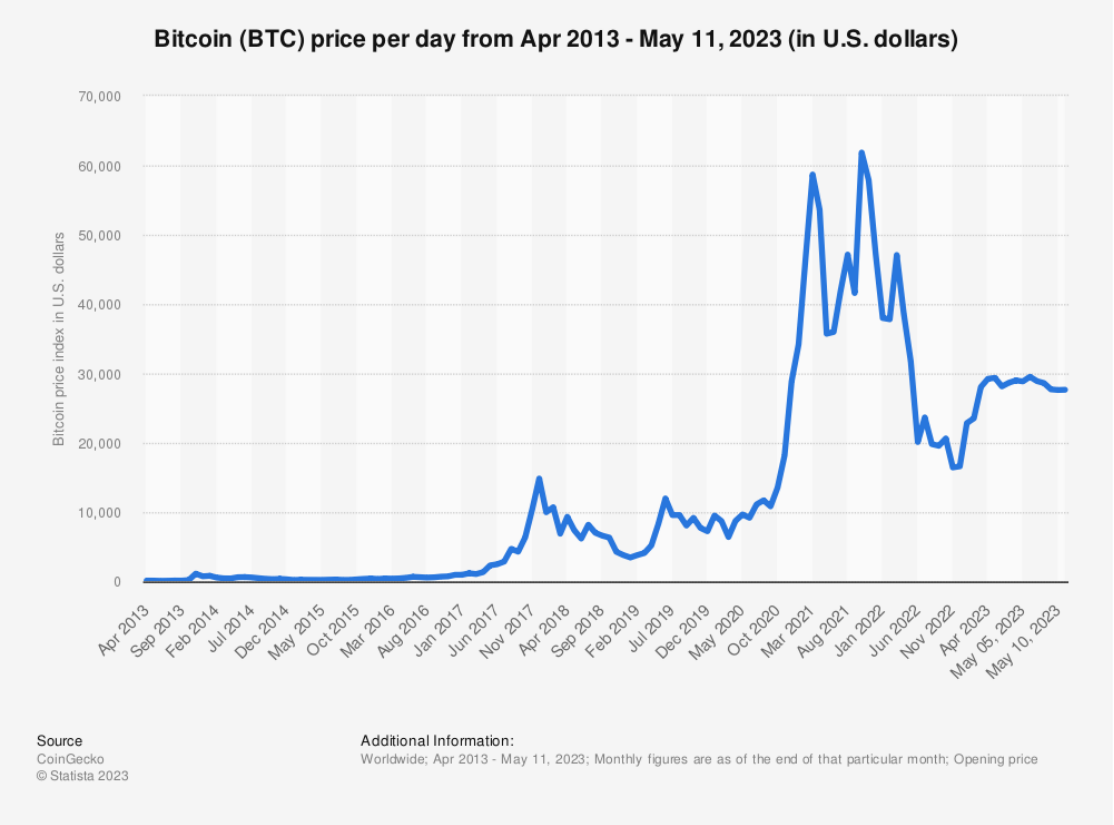

Figure 1: Price history of Bitcoin

Source: CoinGecko

To clarify, the price of bitcoin between 2009 and 2012 was predominantly stable. The year 2013 was an active year, with the currency going from $13.28 to $230 in the first four months, then dropping by 70% in a few weeks. In the last few months of 2013, the price of bitcoin jumped from $123 in October to an unbelievable $1,237.55 by December. The spike did not last through 2014, and at the start of 2015, it had fallen to $218.02. The price increased to $900 at the end of 2016, floated nearly one thousand dollars for the first month of 2017, reached two thousand dollars in the middle of May, and then increased dramatically to $14,839.59 on December 2017. It was this spike that brought attention to Bitcoin. In 2019, Bitcoin's price was very volatile with the price fluctuating between $3000 and $11,000. It then reached $10,000 in mid-2019 before dropping to $7240.85 in mid-December. The Covid pandemic rocked the world economy in 2020 and many people lost their jobs. Businesses were forced to stop operations or scale back, so people began to think of trading in bitcoin as a different means of making a living, which caused the price of bitcoin to increase. Due to the use

of Bitcoin during the pandemic, the value of bitcoin kept increasing starting from the beginning of the pandemic in February 2020 and peaked in March 2021. The peak value of Bitcoin was $58,668.63 during that time. In June 2021 the price decreased to 35,968.99$, and four months later in October 2021, the price reached its highest price ever with almost a 50% increase, reaching a worth of $61,837.26. At the beginning of 2022, the price decreased again to $37,983.11 then increased in March back up to $47,063.23. However, after that, it began to decline and dropped by almost 60% of its value falling to $20,108.36 in June 2022. It continued to decrease in price until it reached a price of $16,441.91, the lowest ever since the pandemic time. Between January and May 2023, the price continued to be volatile and increased until it reached around 27,000$ (Statista, 2023).

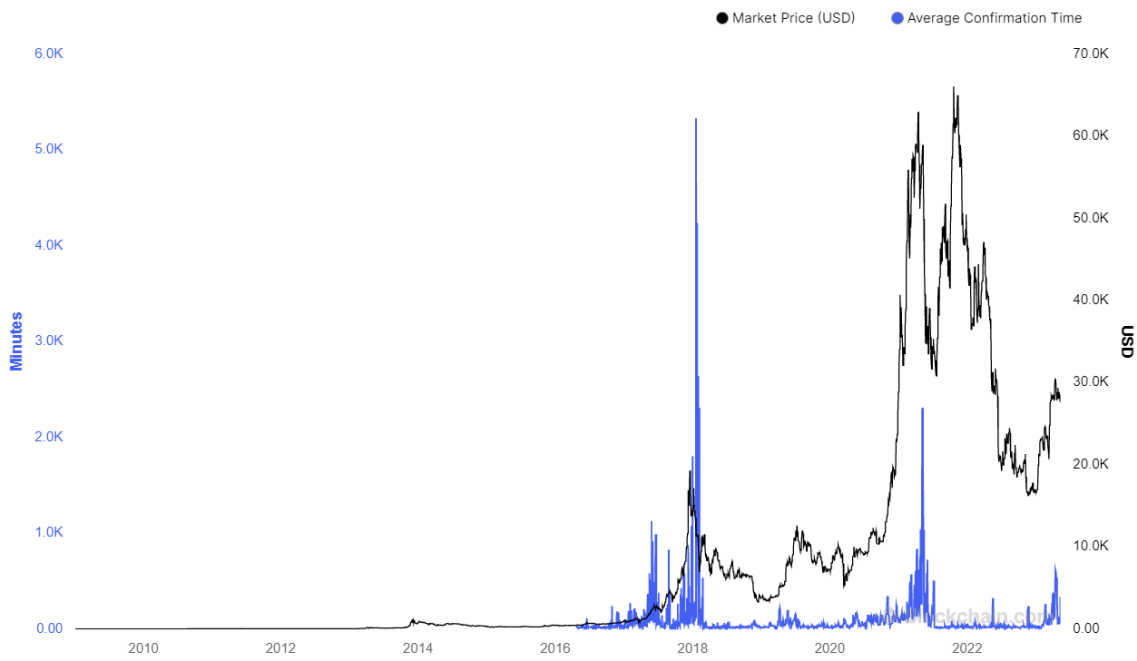

Figure 2: Average Transaction Time of bitcoin

Source: www.blockchain.com

The average time for a transaction with miner fees to be included in a mined block and added to the public ledger. It is noticeable that transactions and availability of Bitcoin reached their highest between 2020 and 2022 (*Blockchain.com | Charts - Average Confirmation Time*, n.d.).

Symbol	Name	Price (Intraday)	Change	% Change	Market Cap
BTC-USD	Bitcoin USD	26,784.58	-50.33	-0.19%	518.899B
ETH-USD	Ethereum USD	1,800.61	-4.35	-0.24%	221.389B
USDT-USD	Tether USD	1.0005	-0.0000	-0.0025%	82.839B
BNB-USD	BNB USD	312.10	+1.29	+0.42%	48.643B
USDC-USD	USD Coin USD	1.0000	0.0000	+0.0022%	29.975B
XRP-USD	XRP USD	0.4263	-0.0008	-0.1825%	22.100B
ADA-USD	Cardano USD	0.3674	+0.0025	+0.6803%	12.804B
STETH-USD	Lido Staked ETH USD	1,797.42	-2.57	-0.14%	11.925B
DOGE-USD	Dogecoin USD	0.0720	+0.0001	+0.1688%	10.030B
SOL-USD	Solana USD	20.94	-0.18	-0.86%	8.281B
MATIC-USD	Polygon USD	0.8535	-0.0044	-0.5107%	7.895B
WTRX-USD	Wrapped TRON USD	0.0693	+0.0002	+0.3459%	7.041B
DOT-USD	Polkadot USD	5.36	-0.02	-0.33%	6.346B
TRX-USD	TRON USD	0.0694	+0.0004	+0.6047%	6.281B
LTC-USD	Litecoin USD	80.87	-0.09	-0.12%	5.897B

Figure 3: Largest cryptocurrencies by market cap.
Source: www.blockchain.com 14\05\2023

The most well-known cryptocurrency is Bitcoin, but there are thousands of other choices when it comes to these digital currencies. However, Bitcoin always makes the news. Cryptos that aren't Bitcoin are frequently regarded as an "also ran"; these are known as "altcoins," or Bitcoin alternatives. Even though Bitcoin may have been the first significant cryptocurrency to enter the market when it first appeared in 2009, many others have since grown to be very successful, if not quite as significant as the original. The largest cryptocurrencies are listed below based on market capitalization, also known

as market cap, which measures the total dollar value of all coins in circulation. (As of May 8, 2023, data is from CoinMarketCap.com.).

2.4. Most Popular Types of Cryptocurrencies

To clarify the figure, here is an overview of the 6 most popular cryptocurrencies nowadays (*Yahoo Is Part of the Yahoo Family of Brands*, n.d.).

1. Bitcoin (BTC)

Price: $28,784.58

Since it was the first cryptocurrency, Bitcoin is still the coin that most people think of when discussing virtual money. The currency made its debut in 2009, according to its enigmatic creator, Satoshi Nakamoto, and has since experienced a roller-coaster of a ride. The cryptocurrency didn't enter the public consciousness, though, until 2017.

2. Ethereum (ETH)

Price: $1,800.61

The second name you're most likely to recognize in the cryptocurrency world is Ethereum, the moniker for the cryptocurrency platform. The currency, ether, can be used in the system for a variety of tasks, but Ethereum's smart contract feature contributes to its popularity.

3. Tether (USDT)

Price: $1,0005

The price of Tether is fixed at $1 per coin. This is because it is a stablecoin. In the case of Tether, the value of a specific asset is linked to the value of the stablecoin. Tether frequently serves as a bridge when traders switch between cryptocurrencies. They stick with Tether rather than switching back to dollars. However, some people worry that Tether uses a short-term type of unsecured debt rather than being securely backed by dollars held in reserve.

4. BNB (BNB)

Price: $312.10

One of the biggest cryptocurrency exchanges in the world, Binance, has its cryptocurrency called BNB. Although Binance Coin was initially designed as a token to pay for discounted trades, it is now also used to make payments and buy a variety of goods and services.

5. USD coins (USDC)

Price: $1.000

Similar to Tether, USD Coin is a stablecoin whose value is fixed to the US dollar and thus should not change. The creators of the currency claim that it is backed by fully reserved assets or those with "equivalent fair value" and that these assets are kept in accounts with regulated U.S. institutions.

6. XRP (XRP)

Price: $0.4263

XRP, formerly known as Ripple, was established in 2012 and provides a means of making payments in a variety of different fiat currencies. Cross-border transactions can benefit from ripple, which uses a trustless mechanism to make payments easier.

2.5. Bitcoin Mining and Transaction Use of Cryptographic Hash Functions

Bitcoins are created through a process known as mining, unlike fiat currencies, which are issued and governed by governments or central authorities. A bitcoin transaction's validity is checked using the mining protocol, which then groups the successful ones into blocks and adds them to the ledger by connecting them to previously accepted blocks. This process rewards the miners with bitcoins. The peer-to-peer network includes the miners. They must gather new transactions and compete to implement a proof-of-work system based on hash cash concepts. Finding the nonce value will allow the miner to send the finished proof of work to the bitcoin network so that it can be added to the blockchain, earning him additional bitcoins as a reward (O'Dwyer & Malone, 2014; Bhaskar & Chuen, 2015). To create bitcoins, users must spend money on hardware and electricity to solve mathematical problems and earn rewards (Kroll, Davey, & Felten, 2013).

In other words, bitcoin mining is the process of making sure that the information in a blockchain block is correct by coming up with a cryptographic solution that meets certain requirements. When a correct solution is found, the miner who found it first gets a reward in the form of bitcoin and fees for the work done. Over time, Bitcoin miners get less money for their work. This process of giving out rewards keeps going until there are 21 million bitcoins in circulation. When that number is reached, the bitcoin reward will stop, and Bitcoin miners will be paid for their work through fees (Frankenfield, 2023).

The miner who successfully calculated a predetermined number of blocks receives a standard reward of 50 BTC. The starting fee is BTC50 per block, and it will be cut in half every 210,000 blocks once that point is reached. When the 21 million target is reached, this reward will eventually become BTC0. The reward was reduced to BTC25 as of mid-March 2014. This is not the only reward offered, though. Some transactions come with a transaction fee that must be paid to the block's discoverer. The price of mining is a factor that influences the reward for miners. That is the amount of current used to search for blocks. And as bitcoin gained in popularity, mining became more challenging. Occasionally, an adaptive algorithm based on the most recent block chain history is used to make the proof-of-work puzzle more challenging. This is done to make sure that over time, the mining of a new block on average every 10 minutes stays constant. ASICs, which produce a higher hash rate while using less energy, were chosen by miners as a solution to this problem (O'Dwyer & Malone, 2014; Kroll, Davey, & Felten, 2013; Bhaskar & Chuen, 2015,). The longest branch is treated as the only valid branch following Bitcoin's rules when there are multiple branches. If there are two concurrent branches, the faster one of the branch's growth depends on how powerful the miners' computers are. Meaning that instead of concentrating their efforts on expanding the branch they voted for, miners try to grow both branches equally, which causes the branch with less computational power to stutter. Working on both branches led to a fork that raised questions about who was the owner of which coins (Bhaskar & Chuen, 2015).

To conclude, here is a simplified example to demonstrate the process. Consider requesting a guess from friends for a number between 1 and 100. Your friends only need to be the first to guess a number that is less than or equal to your number; they don't need to guess it precisely. If a friend guesses 21, 55, and 83 while you are thinking of the number 19, they lose because they all came up with more than 19. However, if there

are only three friends left and the final one correctly guesses 16, they win and the other two are unable to guess. The first person to correctly predict a number between 16 and 19 was the one who guessed 16. In this case, the guesses from your friends are the miner guesses, and the number you selected, 19, represents the target hash the Bitcoin network generates for a block (Frankenfield, 2023).

2.6. The Hash

A hash function, on the other hand, is a crucial mathematical procedure used in blockchain networks. It is required for proof of work, a crucial element that enables miners to reach a consensus on a blockchain. It is practically impossible to predict the input from the output value when using the hash function because it accepts input of any size and converts it into an output of a fixed size (Wang et al. 2019). In blockchain, a block is added to the chain of blocks each time one is made. Since the block must first be validated before it may join or enter the chain of blocks, the procedure is not simple. Cryptographic hash functions are used to carry out this validation. Blockchain is impervious to alteration since each new block must contain the previous block's hash to be persistently connected to the chain of blocks. As a result, if a malevolent party tries to edit a block that is part of a blockchain, it alters both the block's content and its hash, causing it to no longer align with the hash present in the following block. This is so that any slight modification to the beginning date "will produce a hash completely different from the previous one." (Ferreira, Antunes, Zhgulskyy, & Frazo, 2019).

In simpler terms, the hash is the key component of bitcoin mining. The output of running the data in a block through the SHA256 hashing algorithm is the hash, which is a 64-digit hexadecimal number. This step only needs to be done once, and you can generate a hash by pasting some content into an online SHA256 hash generator in under a second. This is how Bitcoin generates a block hash for encryption purposes. The challenging part is getting that hash back to the pasted content, as it can take centuries for modern hardware to decode a 64-digit hash (Frankenfield, 2023).

Figure 4: Hash rate over time

Source: www.blockchain.com

The total hash rate of a cryptocurrency is the amount of total power being used on a blockchain network to validate transactions. It is used to measure the security of the network as well as the difficulty to mine the cryptocurrency. Hash rate is usually measured in terahashes per second (TH/s). Each hash is equal to a different input, meaning that 1 TH/s is equal to a trillion inputs every second. The total hash rate of a cryptocurrency is subject to change over time depending on the number of data miners within the blockchain network. The difficulty of mining is also subject to change and can affect the total hash rate.

The total hash rate of Bitcoin has increased exponentially since its launch in 2009. In 2011, the rate of the Bitcoin network was below 1 TH/s and increased significantly the following year, reaching a rate of 25 TH/s. By the end of 2013, the Bitcoin network reached a total hash rate of 10,000 TH/s due to the improvement of crypto mining hardware. The growth continued in 2014 and peaked at over 350,000 TH/s. It remained stable in 2015 at around 300-400,000 TH/s, but increased dramatically in 2016, breaking the 1M TH/s milestone. After reaching a peak of 14M TH/s in 2017, the price of Bitcoin dropped in 2018 and caused a decline in several miners, which led

to the rate decreasing back to 4M TH/s. Since then, the hash rate of the Bitcoin network continued to steadily increase and reached rates of over 350M TH/s in 2022.

Mining difficulty measures how difficult it is to mine a Bitcoin block. The higher the difficulty, the more computing power is required to mine the same number of blocks. This means that mining difficulty is directly related to the total hash rate and as the hash rate increases, so does the difficulty. This is purposely done by the network to maintain a consistent block mining rate.

2.7. Blockchain

When bitcoin began to gain popularity in 2014, after years of obscurity following its creation, people's interest was also piqued in blockchain, the underlying technology used to securely record bitcoin transactions. Both the financial and non-financial worlds found numerous uses for the technology. Further interest led to the technology becoming so hyped in the years 2015 and 2016 that it was mentioned on the covers of a few major publications, including The Economist. As the technology managed to attract more than $500 million from venture capitalists in both years and sprout hundreds of start-ups as well as a brand-new fintech industry, the publicity also brought in some financial benefits (Meunier, 2018). Bitcoin made blockchain more well-known, but it is not just the basis for cryptocurrencies. It is a technological advancement that has transformed the digital sphere, bringing a new perspective to the security, resiliency, and efficiency of systems, facilitating the exchange of all kinds of goods, services, transactions, or information, and opening the possibility of creating newly globalized networks that would strongly motivate the engineering of new business models for producers and companies (Ahram, Sargolzaei, Sargolzaei, Daniels, & Amaba, 2017). Blockchain is built on distributed ledger technology, which provides a consensus validation mechanism through a network of computers that allows peer-to-peer transactions and does not require an intermediary or a centralized authority to keep the information resulting from the transactions current.

Blockchain is a peer-to-peer digital ledger of transactions that can be distributed to all stakeholders in a public or private manner, ensuring transparency and doing away with the need for intermediaries or third-party administrators to carry out transactions. Double-spending is prevented, transactions are verified for legitimacy using

cryptography and consensus mechanisms (such as proof of work or proof of stake), and high-value transactions are made possible in a setting free of the need for trust by ensuring that all parties involved have access to accurate and consistent records, permanent, immutable transaction records are helped to be created by entities, and network users' anonymity is made easier (Michael, Cohn, & Butcher, 2018).

In almost every industry, information technology has emerged as a crucial innovation. When it comes to disrupting the status quo in a leadership position, those organizations or teams that can use technology correctly and effectively play a significant role. People who don't adapt to technology typically don't make it. Blockchain technology has been identified as a catalyst for new applications in the financial and non-financial sectors of healthcare, industrial manufacturing, and supply chains. According to the research, Blockchain can significantly alter how businesses and applications are digitized by enabling secure trust frameworks, fostering agile value chain production, and integrating more closely with other technologies like cloud computing and IoT. The researchers have shown their ability to use professional engineering principles, a DevOps approach to iterative development and management, and integration of cyber security, distributed computing, and blockchain technologies by creating a cloud-based application called Health Chain. Health Chain is just one of many instances that show how transformative Blockchain technology can be. By effectively utilizing mobile, IoT (Internet of Things), social media, analytics, and cloud technology to generate models for better decisions, the industry is looking to produce efficiencies, develop new innovative products, and strengthen customer relationships globally. A secure method of exchanging any good, service, or transaction is provided by a blockchain. We have gained knowledge and recommendations that can be applied to other industries, such as health care, where security, transformation, and regulation play a major role in advancement, as a result of developing the initial technology in the financial sector. More agile value chains, quicker product innovations, closer customer relationships, and quicker Internet of Things (IoT) and cloud technology integration will all be made possible by blockchain. Blockchain offers built-in, highly effective cyber security features that enable instant contracts, engagements, and agreements (Ahram, Sargolzaei, Sargolzaei, Daniels, & Amaba, 2017).

Figure 5: Value of HIVE Blockchain Technologies Ltd overtime.

Source: www.finance.yahoo.com

HIVE is an example of a blockchain that was started in March 2020. It was the first crypto miner to be publicly traded and mainly mines Bitcoin. HIVE is a blockchain that focuses on decentralization from banks allowing users to transfer and store money without the use of a middleman. In addition, HIVE also focuses on community building and censorship resistance to avoid disproportionate levels of power and influence between stakeholders.

3. MONEY FROM ISLAMIC PERSPECTIVE

3.1. What is money in Islam?

Islam based its view of money on Shari'ah and the idea that Allah is the ultimate owner of everything. A person carries money that he owns as Allah's sustainer, which means that it must be used and invested in line with Shari'ah. Islam rejects egotism, and financial resources are intended to advance socioeconomic justice for the good of the community.

Hosein (2007) explored the idea of money from an Islamic perspective, focusing on how the hadith concerning the six Ribawi articles should be interpreted. "Prophet Muhammad said: Gold for gold, silver for silver, wheat for wheat, barley for barley, dates for dates, salt for salt, like for like, hand to hand," according to Hadith by Abu Sa'eed Al-Khudri.

Based on this understanding, the author, Hosein, offers a more detailed explanation of money in Islam. He argues that the only types of currency allowed in Islam are precious metals like gold and silver, as well as commodities such as wheat, barley, dates, and salt may be used as money if precious metals become limited. A community may also employ other agricultural or widely used commodities as currency. The author further contends that goods used as money should be exchanged for their real value, not only their nominal value and that they must be commodities by Allah, with values set by Him. Finally, Hosein argues that when trading between similar kinds, money should be used in an equal amount and at the same location. This isn't always the case, though, with non-currency goods like clothing or cattle. Money in Islam is limited to precious metals and commodities with a shelf life, traded for their intrinsic value, and found in commodities created by Allah, according to Hosein's interpretation of the well-known hadith concerning the six Ribawi items. Paper money, according to Hosein, loses these characteristics and is open to manipulation. Hosein's definition appears fair to both parties from the standpoint of Islamic laws governing business transactions since it ensures that both parties obtain something of genuine value in any economic transaction. Trades with merely nominal value could be compared to gharar sales, which are against Shari'ah law (Hosein, 2007).

Islamic scholars divide money into two categories: natural currency (thaman khilq) and customary currency (thaman 'urf). A natural currency is something that was made specifically to act as a medium of exchange due to its inherent monetary characteristics. Because they have inherent qualities that make them suitable as currency, gold, and silver are examples of natural currency. According to Al-Ghazali (2011), Allah created gold and silver to be used as a benchmark for valuing and pricing goods. Natural currency is distinct from customary currency, which isn't inherently monetary but is used as a medium of exchange by people because it's accepted and follows tradition. The primary function of traditional money is not to act as money. Commodity money (other than gold and silver) and fiat money are typical types of traditional money. The difference between fiat currency and commodity money is that while both lack intrinsic thamaniyyah, the latter has extrinsic thamaniyyah based on social acceptance. Commodity money has inherent value. Commodities lack extrinsic thamaniyyah because, from the outside, they are not seen as subjects of exchange but rather as mediums of exchange (Adam & Barkatulla 2019; Lawal 2019; Paizin 2021).

(Sifat & Mohamad, 2018) discussed the idea of money from the perspectives of Islamic law and modern economics. It makes the case that money can be any form of exchange that society accepts, regardless of its intrinsic value, and it provides historical examples of instances where the type of money used was determined by societal acceptance, such as animal skins or even small pieces of stone or wood. The article challenges the idea that gold and silver have an exclusive religiously ordained right to be considered as money, contrary to some dinars claims, and cites the opinions of Islamic scholars, including Malik bin Anas, Ibn Taymiyyah, and al-Ghazali, who pointed out the significance of societal acceptance in defining money.

Only items with intrinsic value are accepted as money in Islam, including gold, silver, rice, dates, wheat, barley, and salt. Islam views money as an exchange medium that cannot be turned into profit by renting it out or selling it. Money can only be exchanged for products and services; unless a spontaneous exchange takes place, it cannot be swapped directly for other forms of currency. Money can only be made through legal trade and investment where parties share risks and rewards; making money from money (riba) is prohibited. Moreover, Islam rejects the idea of the time value of money, especially when it becomes the primary factor in lending (Afiibi, n.d.).

Meera and Larbani (2006b) identified five key characteristics that a commodity must have to effectively act as money in the economics literature. These characteristics include acceptability, divisibility, mobility, being standardizable or homogeneity, as well as durability or stability. The phrase "standardizable" describes how simple it is to calculate a commodity's value. The commodity must have a rare, widely acknowledged intrinsic worth to be considered acceptable. For a variety of values to be exchanged, there must be divisibility. Money must be portable to be carried anywhere. Finally, stability or durability is required to guarantee that the good does not quickly degrade, perish, deplete, or erode over time (Meera & Lerbani, 2006).

Furthermore, according to Meera and Larbani (2006b), numerous Islamic scholars throughout history, such as Ibn Taymiyyah, Al-Ghazzali, Qudama ibn Jaafar, ibn Khaldun, and al-Maqrizi, viewed gold and silver as "Shari'ah money." They emphasize the idea that inflation and a lack of necessities played a part in the transition from gold and silver to copper falls during the rule of Muhammad al-Kamil ibn al-'Adil in Egypt and Syria. It is important to remember that some ahadith forbid fixing the price of gold to silver for any future exchanges. Instead, the price at the time of the transaction should be based on the spot market rate. This implies that the mint or any other authority cannot determine a fixed ratio for the exchange of gold and silver for future dates (Meera & Lerbani, 2006). Additionally, the price of gold or silver coins will depend on the global market's supply and demand for those metals, which could harm price stability (Hasan, 2008).

3.2. Money in Islamic history

Financial transactions and monetary systems have a long history in Islamic history. Early Muslims did not use a single form of money or coinage; instead, they traded primarily goods like gold, silver, and other metals. However, the Prophet Muhammad (peace be upon him) established several guidelines for financial transactions and forbade several customs, including the practice of adding interest (riba) to loans.

The introduction of the dinar and dirham, which were made of gold and silver, respectively, during the Islamic Golden Age helped the Islamic Empire create a sophisticated monetary system. In the Islamic world, these coins were widely used for

trade and commerce. Additionally, the idea of bimetallism, which permitted the trade of gold and silver at a set ratio, served as the foundation for the Islamic monetary system. The arrival of Islam during the time of Prophet Muhammad (peace be upon him) brought about significant changes in the economic system of Arabia. He emphasized the importance of trade and commerce and encouraged Muslims to engage in business and entrepreneurial activities. He also established certain financial principles and practices, such as the prohibition of interest (riba) and usury. He also established the concept of sadaqah, which was a form of voluntary charity. The Islamic financial system that emerged during the Prophet's time was based on the principles of justice, fairness, and equity. Also, Prophet Mohammad encouraged cooperation, risk-sharing, profit-sharing, and the use of written contracts. He also established a financial institution

n known as Bayt al-Mal, which served as a central bank and provided loans to those in need. The principles of justice, equity, and social responsibility continue to guide Islamic finance today.

The historical development of the monetary system during the time of the Prophet Muhammad (SAW) and the early Islamic caliphs was discussed in (Chapra, 1996). The currency system was based on a bimetallic standard with fixed ratios of 1:10 for the circulation of gold and silver coins, known as dinars and dirhams. This ratio, though, was not constant and fluctuated over time, occasionally rising as high as 1:50. Due to this instability, problems like Gresham's Law, in which bad coins drive good coins out of circulation, arose. Al-Maqrizi and al-Asadi are cited in the author's discussion of historical sources to emphasize the difficulties and alterations in the traditional Islamic monetary system.

(Karaoglu,2020) discussed the economic-fiscal laws and practices of the Prophet Mohammed (SAW) and the early Muslim community in Medina, as well as those of the Umayyad and Abbasid periods following the rule of the First Caliphs. It shows how Islamic cultures developed their involvement in economic and financial transactions as they seized lands from China to Arabia. The author highlights the importance of finance requirements for consumption, trade, and investment during these times by mentioning the development of legal rules and regulations for manufacturers, merchants, and consumers.

In the Medina era of the Prophet, the Bayt al-Mal, or treasury, which stands for the financing needs of the public and societal segments, was first observed as working toward income and expenditure areas following the Qur'anic orders. It resembled a system for collecting and distributing donations such as zakat and sadaqah, looted property and income, and ransom payments for captured enemies. It is reported that during this time, various locations, including the Prophet's home for cash, a room on the second floor of Masjid al-Medina for agricultural goods, and a location outside of Medina for animals, had been used as a physical space. It is known that there were other attendants, including Omar bin Khattab and Bilal Al-Habashi, who were charged as well. Under the Caliphate of Omar bin Khattab, it is apparent that Bayt al-Mal's corporate structure as a financial institution had grown along with the expansion of Islamic conquests. This institution appears to have developed with a dual structure during the Umayyad and later Abbasid periods, with assets belonging to the Caliph and the public. It is said that in addition to the war councils, army councils, and sadaqah councils, the Abbasids established the Bayt al-Mal Council and took receipt books. It evolved into a treasury during the Mameluke, Fatimid, and Ottoman eras as well, recording incomes and expenses with an increase in income-expense items due to diversification (Erkal, 1992: 90–94).

The Bayt al-Mal organization was one that regularly provided loans to Muslims in need, received loans to fund jihad, kept track of these transactions, and conducted them without charging interest. It should be noted that some operations described in contemporary economics-finance literature as "domestic borrowing" or "credit" and entailing giving a material benefit (interest) to the funder did not exist during the time of the Prophet. As such, it should be noted that these are legal loan (karz) operations (Karaoglu, 2020). (Erkal, 1992) discussed the idea of Bayt al-Mal, a treasury set up in Medina during the time of the Prophet Mohammad (SAW) to fulfill the financial demands of the general public and society groups in line with the Qur'anic teachings. It served as an institution for collecting and assigning income from wartime captures and ransoms, as well as from zakat, sadaqah, and other sources. Initial physical locations for Bayt al-Mal included the Prophet's house for money, the upper level of Masjid al-Medina for agricultural supplies, and a location nearby Medina for animals. Under Omar bin Khattab's Caliphate, it developed into a more organized fiscal system over time. In addition, Bayt al-Mal developed a dual structure during the Umayyad and Abbasid eras,

with assets belonging to the Caliph and assets belonging to the general populace. A Bayt al-Mal Council was also set up by the Abbasids to oversee revenue and expenditures. Bayt al-Mal continued to serve as a treasury in the following eras under the Mamelukes, Fatimids, and Ottomans, recording incomes and expenses and diversifying income-expense items (Erkal, 1992).

It is emphasized that Bayt al-Mal adhered to Islamic norms by lending money to Muslims in need and funding jihad without using usury or interest. The activities of Bayt al-Mal are regarded as legitimate loans (karz) in contemporary economic and financial literature because they did not entail interest. During the period of the first Caliphs and the early Muslims, legal procedures about loans from Bayt al-Mal were conducted following Islamic principles, including relief or ease in case of repayment difficulties and collection from inheritance in case of death (Erkal, 1992).

(Aybakan, 2009) mentioned Muslims often needed loans and used usury seemed to be commercial activities to get money in exchange for future profits. For instance, the "expend agreement," which required advance payment collection at the time of the agreement to avoid usury and potential issues, was a condition mentioned in Islamic law. Certain Muslims are known to have gained wealth through "safety deposits" provided to them by their community during earlier times. Zubayr ibn al-Awam was known to accept these deposits as loans to use the money.

3.3. Mal, Commodities, and the Relationship to Money

The term mal has been used to describe money or other materials, but it has a far larger definition because it refers to anything that is possessed. Within the Shari'ah, money is categorically considered only for its fundamental function as a means of commerce and a measure of worth. While money has no fundamental worth or purpose, commodities like gold, silver, and food, among others, do. Instead of being viewed and treated as an end in and of itself, money should be understood as a way to access other goods. Money does not demand that level of clarity, whereas different commodities have distinct values even if they fall under the same category (Sanneh, 2022).

A person can start a transaction with a 100TL bill and then exchange it for another 100TL bill later on, or they can pay with lower denominations like 50TL or

20TL (Abu-Bakar, 2018, pp. 14–15; Orhan, 2020, p. 5). Mal is a notion that neither of the sources explicitly defines; instead, they leave it up to the general public's interpretation. It refers to anything that may be bought and owned, including gold, silver, animals, a fruit garden, and date palms. Some Hanafi jurists stated that mal must be a physical entity, however, Mufti Taqi Uthmani (2014) rejected this claim because a fatwa accepted gas and electricity as mal (Adam & Barkatulla, 2019, p. 126). Modern lawyers have tried to maintain the Hanafi perspective while accommodating these categories in their definition of mal. (Islam M. W., 1999; Abu-Bakar, 2018; Arif & Hanapi, 2017) They claim that "mal is everything with material value among people, or whatever is capable of being under possession, protection, and customarily recognized to have beneficial use."

In conclusion, it is evident that money is Mal, but Mal is not money. In other words, we can determine that mal is a subset of money, but Mal is a general term that includes more than just money.

4. CRYPTOCURRENCY FROM AN ISLAMIC PERSPECTIVE

In recent years, cryptocurrency has gained significant attention and popularity as an alternative form of digital currency. However, from an Islamic perspective, the permissibility and ethical implications of cryptocurrencies are debatable. The purpose of this literature review is to analyze and summarize the key findings of four research papers that discuss cryptocurrencies from an Islamic perspective, with a focus on their compliance with Islamic principles and potential economic impact.

Amadou Sanneh's research paper, "Cryptocurrency in Islamic Finance: Justifications, Limitations, and Challenges," examines the implications and considerations of incorporating cryptocurrency within the framework of Islamic finance. The paper investigates the Islamic justifications for and against the use of cryptocurrencies, identifies their limitations, and addresses the issues associated with their integration into the Islamic financial system.

Sanneh begins by emphasizing the potential benefits of cryptocurrencies in Islamic finance, such as financial inclusion, increased efficiency, and transparency. He discusses the arguments for cryptocurrencies, focusing on their compatibility with Islamic principles such as decentralization, peer-to-peer transactions, and enhanced traceability. However, the paper also discusses the limitations and challenges that cryptocurrencies present in the context of Islamic finance. Concerns about the speculative nature of cryptocurrencies, their potential for market manipulation, and their lack of intrinsic value are raised by Sanneh. He investigates how these characteristics are at odds with Islamic principles such as avoiding uncertainty (gharar) and promoting economic justice. The research paper also discusses the difficulties in regulating and integrating cryptocurrencies into the Islamic financial system. Sanneh discusses the importance of having clear guidelines and standards in place to ensure Shari'ah compliance, mitigate risks associated with cryptocurrencies, and protect stakeholders' interests. The paper also emphasizes the significance of addressing money laundering, terrorist financing, and consumer protection issues (Sanneh, 2022)

Overall, the research paper presents a balanced analysis of the topic, outlining both the benefits and drawbacks of incorporating cryptocurrencies into Islamic finance. It urges careful consideration of cryptocurrencies' compatibility with Islamic principles

and highlights the challenges that must be overcome for their effective integration into the Islamic financial system.

Dodik Siswantoro's (2020) article "The Requirements of Cryptocurrency for Money: An Islamic View". Dodik Siswantoro explores the concept of cryptocurrency from an Islamic perspective in his article "The Requirements of Cryptocurrency for Money: An Islamic View," and evaluates its compliance with the requirements of money in Islamic finance. The article investigates the key characteristics of cryptocurrencies and assesses their compatibility with Islamic economic principles. Siswantoro begins by defining money in Islamic finance as a medium of exchange, a unit of account, a store of value, and a measure of deferred payments. In light of these requirements, the article then investigates the characteristics of cryptocurrencies such as decentralization, cryptographic security, and digital nature.

According to the author, while cryptocurrencies have some characteristics that align with the needs of money, they also have some limitations. Siswantoro emphasizes the importance of a currency's value stability and widespread acceptance for it to function effectively, both of which cryptocurrencies frequently struggle with due to their volatility and limited acceptance. Furthermore, the article discusses the potential problems associated with the Islamic principle of riba (usury) in the context of cryptocurrencies. To ensure compliance with Islamic finance principles, Siswantoro emphasizes the need for clarity in determining the treatment of interest-based mechanisms and financial transactions within cryptocurrency frameworks (Siswantoro, 2020).

Finally, Siswantoro emphasizes that, while cryptocurrencies have some characteristics of money, their compliance with the requirements of money in Islamic finance is debatable. According to the article, more research and analysis are needed to address the challenges and concerns related to the stability, acceptance, and treatment of interest within cryptocurrency systems from an Islamic standpoint.

The article "Cryptocurrency as a Fin Tech Instrument and Islamic Finance: The GCC Perspective" delves into the intersection of cryptocurrency and Islamic finance, focusing on the Gulf Cooperation Council (GCC) countries' perspectives. The article investigates the potential of cryptocurrencies as a financial technology (FinTech) instrument, as well as their compatibility with Islamic finance principles. The authors

begin by discussing cryptocurrencies' emergence and growth as a disruptive force in the financial industry. They emphasize the key characteristics of cryptocurrencies, such as decentralization, transparency, and cryptographic security, that have contributed to their global popularity and adoption. The article examines the fundamental principles and values that guide financial transactions within the GCC countries in the context of Islamic finance. It investigates whether cryptocurrencies are compatible with these principles, which include the prohibition of interest (riba) and uncertainty (gharar), as well as the promotion of fairness and ethical behavior (Abdeldayem, 2020).

The authors present a thorough examination of the challenges and opportunities associated with incorporating cryptocurrencies into the GCC countries' Islamic financial systems. To ensure the integrity and stability of cryptocurrency transactions, they discuss regulatory considerations such as the need for Shari'ah-compliant frameworks, consumer protection measures, and anti-money laundering controls. In addition, the article investigates the potential benefits of cryptocurrencies to Islamic finance, such as increased financial inclusion, lower transaction costs, and increased transparency. It also looks into the role of blockchain technology, the underlying technology that powers cryptocurrencies, in facilitating efficient and secure financial transactions (Abdeldayem, 2020).

Overall, the article provides a nuanced analysis of the Gulf Cooperation Council's (GCC) perspective on cryptocurrencies as a FinTech instrument in the context of Islamic finance. It emphasizes the importance of careful evaluation, regulation, and innovation to maximize the potential benefits of cryptocurrencies while adhering to Islamic finance principles and mitigating associated risks.

Alzubaidi's research paper "Developing Digital Currency from an Islamic Perspective: The Case of Blockchain Technology" investigates the potential of blockchain technology in developing digital currencies that adhere to Islamic principles. The purpose of this paper is to examine the characteristics of blockchain technology and its compatibility with Islamic finance, as well as to provide insights into the development of digital currencies from an Islamic perspective.

The paper starts with an introduction to blockchain technology, emphasizing its decentralized and transparent nature. It explains how blockchain technology allows for secure transactions while also keeping a transparent record of all transactions, reducing

the risk of fraud and manipulation. The research investigates the key principles and values that guide financial transactions following Islamic teachings in the context of Islamic finance. It discusses the prohibition of riba (usury), gharar (uncertainty), and the significance of fairness and ethical behavior in financial transactions.

The paper emphasizes the potential of blockchain technology to address some of the challenges that traditional banking systems face when adhering to Islamic finance principles. It contends that blockchain-based digital currencies can provide a more transparent and efficient financial system that is consistent with Islamic finance principles because they reduce the presence of intermediaries and promote trust and fairness in transactions. Furthermore, the study goes over the potential applications of blockchain technology in Islamic finance that go beyond digital currencies. It investigates the use of blockchain for smart contracts, Islamic microfinance, and zakat (charitable giving), among other things, to improve transparency, efficiency, and social impact within the Islamic finance ecosystem.

The paper concludes by recognizing blockchain technology's potential to revolutionize the financial industry and making recommendations for further research and development in the field of digital currencies from an Islamic perspective.

5. SWOT ANALYSIS FOR CRYPTOCURRENCY

This research article gives a thorough SWOT analysis of cryptocurrencies, looking at their strengths, weaknesses, opportunities, and threats. As cryptocurrencies become more popular as a decentralized digital alternative to traditional currencies, it is important to understand the internal and external factors that shape this ecosystem. The goal of the analysis is to give investors, financial institutions, regulators, and society useful information about what cryptocurrencies mean to them. It recognizes that the cryptocurrency market is always changing and stresses how important it is to keep up with the latest news and changes to regulations. By doing this SWOT analysis, the article adds to what is already known and makes it easier to make smart decisions in the world of cryptocurrencies.

Table 1. SWOT analysis for cryptocurrency.

S	S1. Security: personal data protection. S2. Decentralization: This enhances security and transparency. S3. Cryptocurrency is immune to inflation. S4. Global Accessibility: fast, safe, and unlimited transactions. S5. Low-cost transactions. S6. Potential for High Returns: providing the opportunity for investors to make substantial profits.
W	W1. Strong Volatility W2. Large Risks of Investing W3. Lack of Understanding and Awareness. W4. Environmental Impact.
O	O1. Institutional Adoption: Increased interest from institutional investors and corporations in cryptocurrencies can bring stability and liquidity to the market. O2. The tokenization of physical assets O3. conventional financial environment transformation
T	T1. Security Risks: Despite cryptographic security measures, cryptocurrencies are still vulnerable to hacking, fraud, and scams, which can erode trust in the ecosystem. T2. Regulatory Challenges: Stricter regulations or bans on cryptocurrencies in some jurisdictions can limit their adoption and disrupt market dynamics. T3. Competition: The cryptocurrency market is highly competitive, with thousands of cryptocurrencies vying for market share. T4. Technological Obsolescence: Blockchain technology is rapidly evolving, and new advancements may render certain cryptocurrencies obsolete if they fail to adapt. T5. Market Speculation: Cryptocurrency markets are prone to speculation and irrational behavior, which can lead to market bubbles and subsequent crashes.

5.1. Strengths

S1. Security: Data security and cryptocurrency security are crucial components of the cryptocurrency ecosystem. To maintain the integrity and confidentiality of user data and assets, cryptocurrencies must overcome specific security challenges related to operating in a digital environment. Here are some aspects of cryptocurrency security and data protection (Ivaschenko, 2016):

1. Anonymity. It is completely transparent while also remaining completely anonymous. Any business can generate an unlimited number of bitcoins addresses without using its customers' names, addresses, or any other personal data.
2. There is no centralized server in charge of all operations in a peer-to-peer cryptocurrency network. Instead, data exchange—including financial transactions—takes place directly between two or more software clients. The installed software-wallet of every user joins the Bitcoin network. Each client keeps track of all completed transactions as well as the total amount of bitcoins stored in each wallet. Many distributed servers process these transactions. As a result, the exchange of money between parties involved in the cryptocurrency network is uncontrollable by banks, taxes, or governments.
3. Algorithms used in online banking are incorporated into the open-source code for mining cryptocurrencies like Bitcoin (BTC). The BTC network shares transaction details (such as how and when they occur) without disclosing the sender's or recipient's identities, in contrast to internet banking systems that reveal user information. The wallet owner's data is still inaccessible.
4. Only the wallet's owner is entitled to it. There is a special form of electronic payment where the account is owned solely by the owner. For instance, on PayPal, the system has the authority to freeze all funds on the account without even informing the owner if for some reason the company determines that the owner is using the account improperly. The owner is solely responsible for confirming the proper use of the account. The owner

of a Bitcoin has a private key and a corresponding public key, which together make up the wallet's address. Bitcoins can only be withdrawn by the owner.

5. No possibility of using personal information for fraud. This is a crucial idea. Credit cards are now used for the majority of purchases. They can't be trusted. Customers must enter the following information when filling out forms on websites: card number, expiration date, and code. It's difficult to think of a less secure method of payment. Credit cards are therefore frequently stolen. BTC transactions don't need any personal information to be disclosed. Instead, two keys—public and private—are used. The private key is only known to the owner, while the public key is accessible to everyone (i.e., the BTC wallet's address). A mathematical function must be used along with interlocking private keys to sign the transaction. This provides proof that the owner carried out the transaction.

In this regard, Franco (2014) claims that there is a low risk for Bitcoin users if a merchant or other party to a transaction is the victim of a cyberattack and loses traditional financial or personal data related to customers or its own. Users of Bitcoin are only in danger if hackers can access their private keys. In 2016, the average price of a data breach was $4 million. The highest average cost per capita that year was $221 in the US and $213 in Germany. Each industry has a different cost structure. An average lost or stolen record cost $158 globally. Costs for the healthcare and educational sectors increased ($355 and $246 respectively). The lowest average costs for a lost or stolen record were in the public sector ($80), transportation ($129), and research ($112). Insiders and hackers were typically to blame for data breaches. Attacks that were malicious or illegal accounted for 48% of all violations and had a $170 average cost per record to resolve (Ponemon Institute, 2016). Short-term loan provider Wonga experienced a sizable data breach in 2007. Private information of about 245,000 customers, including bank account numbers, full names, email addresses, residential addresses, phone numbers, and the last four digits of debit card numbers, may have been compromised (Dunn, 2017).

S2. Decentralization: Cryptocurrencies differ from conventional centralized financial systems in that they are fundamentally decentralized. Decentralization in the context of cryptocurrencies refers to the division of power, decision-making, and record-keeping among a network of participants, doing away with the requirement for a central

authority or middleman. Blockchain is a type of distributed ledger that is maintained by numerous users, or "nodes," and is used by cryptocurrencies. To ensure transparency and do away with the need for a centralized authority, each node keeps a copy of the entire transaction history (Nakamoto, 2008). In a peer-to-peer network, transactions in cryptocurrencies take place directly between participants without the use of middlemen like banks. Through a consensus mechanism involving many nodes, the network verifies and validates transactions (Swan, 2015). Cryptocurrencies use consensus mechanisms, such as Proof of Work (PoW) or Proof of Stake (PoS), to come to an understanding regarding the legitimacy of transactions. These controls ensure decentralized decision-making and guard against total dominance by any one party (Buterin, 2013). By removing single points of failure, decentralization improves security. The network continues to function and upholds data integrity even if some nodes fail or are compromised (Antonopoulos, 2014). The need for trust in middlemen is diminished by decentralization. Instead of putting their faith in centralized authorities, participants can rely on the cryptographic protocols and consensus mechanisms of the cryptocurrency network (Szabo, 2002).

S3. Cryptocurrency is immune to inflation: As a result of its distinct features and underlying technology, cryptocurrency is frequently hailed as being resistant to inflation. Cryptocurrencies offer a different monetary paradigm than traditional fiat currencies, which can be subject to inflationary pressures brought on by a variety of factors such as governmental policies and economic conditions. The majority of cryptocurrencies have a maximum supply cap that has been set in advance, which means that there is a limit to how much of the currency can ever be produced. The maximum supply of Bitcoin, the original and most popular cryptocurrency, is 21 million coins. Contrary to traditional currencies, which can be printed at will by central banks, this finite supply prevents the arbitrary creation of new units. Because of this inherent scarcity, cryptocurrencies offer protection from inflationary pressures.

Cryptocurrencies work on decentralized networks like blockchain, where participants rather than a central authority verify transactions. No one organization will be able to control the supply or value of the currency thanks to this decentralization. Cryptocurrencies are less prone to inflation brought on by excessive money printing because there is no single entity in charge of regulating the money supply. "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction," written by Narayanan

et al. (2016), claims that "The decentralization of Bitcoin is a crucial feature that sets it apart from traditional financial systems, where central banks have significant control over the money supply."

To participate in the consensus process using these mechanisms, participants must either invest computational power or own a stake in the currency. By giving network users incentives to act in the system's best interests, this promotes the stability and security of the network. Cryptocurrency consensus algorithms, as explained by Zheng et al. (2018) in their research paper on "Cryptocurrency Consensus Algorithms," "prevent inflation by ensuring that only valid transactions are accepted, and new units of the currency are issued according to predefined rules." To maintain stability and avoid inflation, cryptocurrencies frequently use economic models. To maintain a constant issuance rate, some cryptocurrencies, for instance, have built-in mechanisms that adjust the mining difficulty or block rewards. These patterns assist in balancing the supply and demand of the currency and guard against sudden spikes in inflation (Bouoiyour and Selmi, 2015).

Although some cryptocurrencies may experience price volatility, it's important to remember that their fundamental design principles make them resistant to inflationary pressures. Cryptocurrencies are immune to inflation due to their limited supply, decentralization, consensus mechanisms, and economic designs, giving users a different type of currency that works differently than conventional fiat currencies.

S4. Global Accessibility: Cryptocurrencies offer an open, cross-border financial system that enables people from all over the world to engage in online transactions. Cryptocurrencies, in contrast to traditional banking systems, can be accessed by anyone with an internet connection and a digital wallet, with no restrictions based on location or access to financial infrastructure (Tariq et al, 2018). Cryptocurrencies also allow for nearly instantaneous fund transfers. Blockchain technology enables transactions to be processed and verified in a matter of minutes, giving users access to effective and quick value transfers (European Parliament, 2019). Finally, unlike traditional financial systems, which might impose limitations or charge extra for high-frequency transactions, cryptocurrencies allow for limitless, frictionless transactions. Those looking for quick, secure, and unrestricted ways to conduct digital transactions will find

cryptocurrencies to be a viable alternative to traditional financial systems due to their global accessibility and transactional advantages.

S5. Low-cost transactions: Cryptocurrencies' ability to enable inexpensive transactions when compared to conventional financial systems is one of their notable benefits. Innovative technologies and decentralized networks are used by cryptocurrencies to enable transaction processing that is reasonably priced. The general trend is towards affordability and lower transaction costs, even though specific fee structures may vary across different cryptocurrencies and platforms.

5.2. Weaknesses

W1. Strong Volatility: Strong Volatility is the rapid and significant price changes that cryptocurrencies experience over relatively short periods. Contrary to traditional financial markets, where regulatory frameworks and well-established trading practices frequently help to control volatility, cryptocurrencies operate in a decentralized and generally unregulated environment. As a result, their prices are susceptible to abrupt and significant changes that are caused by a variety of factors. Due to the market's infancy, investor sentiment and expectations for the future have a significant impact. Positive press, changes in regulations, or powerful endorsements can boost demand and drive up prices. On the other hand, bad news, government crackdowns, or security breaches may trigger panic selling and cause steep price drops (Li et al., 2021). Cryptocurrencies frequently don't have established fundamental valuation models, in contrast to conventional financial assets. Several factors, including a lack of underlying cash flows, a small adoption rate, and technological uncertainties make it difficult to determine the intrinsic value of cryptocurrencies. Due to this, speculative trading and herd behavior may have a greater impact on the volatility of cryptocurrency prices (Ciaian et al., 2018). Because there is little market depth, even a small inflow or outflow of money can significantly affect prices. Due to this illiquidity, cryptocurrencies are more susceptible to price manipulation and are more likely to experience large price swings (Wang et al., 2020).

W2. Large Risks of Investing: As previously mentioned, the cryptocurrency market is infamous for its extreme volatility, which is marked by swift and significant price changes that are significantly higher than those of traditional assets.

Cryptocurrencies' decentralized and largely unregulated nature raises the stakes for investors. Investors are susceptible to potential market manipulation, fraud, and security breaches in the absence of thorough regulatory frameworks. Additionally, the lack of mechanisms for protecting investors and the lack of recourse in the event of fraudulent activity increase the risk involved with investing in cryptocurrencies (Dyhrberg, 2016). Price manipulation and unfair practices are more likely to occur in an environment where there are lax regulations and anonymous trading platforms. Investors run the risk of being subjected to coordinated market manipulation-induced artificially inflated prices or abrupt price collapses (Griffin & Shams, 2018).

W3. Lack of Understanding and Awareness: Both investors and the general public face significant difficulties as a result of the lack of knowledge about cryptocurrencies. Blockchain technology, which uses decentralized ledgers, cryptography, and consensus mechanisms, underlies the operation of cryptocurrencies. It can be difficult for people with little technical knowledge to understand the complexities of cryptocurrencies because understanding these concepts calls for a certain level of technical familiarity and knowledge (Christin, 2016). The accessibility and dependability of educational resources are essential for advancing knowledge of and interest in cryptocurrencies. The current educational landscape, however, frequently lacks thorough and user-friendly resources that can efficiently close the knowledge gap. Finally, the explosive growth of cryptocurrencies has resulted in the spread of false information and dependable information sources. It can be challenging to separate false information from factual knowledge when someone is trying to learn about cryptocurrencies because there may be conflicting or inaccurate information available. An additional factor in the lack of knowledge and awareness surrounding cryptocurrencies may be the abundance of false information (Krombholz et al., 2019).

W4. Environmental Impact: Concerns about the environmental effects of this digital asset class have been raised due to the energy-intensive nature of cryptocurrency mining and the carbon footprint associated with blockchain technology. A lot of energy-intensive hardware and specialized mining rigs are used in the mining process, which uses a lot of electricity. The carbon emissions and environmental impact of cryptocurrencies are influenced by this energy use. The environmental impact is further exacerbated by the fact that the majority of the electricity used in mining operations is generated from non-renewable sources, like coal or natural gas. The carbon footprint of

cryptocurrencies has raised awareness of their role in global warming and climate change. If left unchecked, Bitcoin mining alone could push global temperatures above the 2-degree Celsius mark (Stoll et al., 2021). By switching mining operations to renewable energy, one can lessen the carbon emissions caused by cryptocurrencies and encourage environmentally friendly behavior.

5.3. Opportunities

O1: Institutional Adoption: Institutional players, such as financial institutions, asset managers, and businesses, have increased their interest in and investment in cryptocurrencies. Market stability may be improved by institutional investors' entry into the cryptocurrency market. Institutional players frequently bring a slower-moving, long-term investment strategy, which can lessen price volatility. They may be able to stabilize the cryptocurrency market and lessen the effects of short-term speculative behavior thanks to their sizable investments and expert risk management techniques (Cambridge Centre for Alternative Finance, 2021). Institutional investors contribute sizable capital, increasing the market's overall trading volume and depth. This increased liquidity lowers the risk of price manipulation and boosts overall market efficiency by making it simpler for traders and investors to buy and sell cryptocurrencies at fair prices (Baur & Dimpfl, 2018). For institutional investors, regulatory frameworks that address concerns like custody, compliance, and anti-money laundering can instill a sense of security.

O2. The tokenization of physical assets: including real estate, art, and commodities is made possible by cryptocurrencies. Fractionalizing ownership in this way increases liquidity and creates new investment opportunities. Blockchain technology and cryptocurrencies have made it possible for the tokenization idea to emerge as a disruptive force in the financial sector. Real-world assets like real estate, works of art, and commodities can be represented by tokenization as digital tokens on a blockchain. Fractionalizing ownership in this way increases liquidity and creates new investment opportunities. Blockchain technology and cryptocurrencies have made the idea of tokenization possible, and it has the potential to fundamentally alter the financial landscape. Real-world assets like real estate, works of art, and commodities can be represented by tokenization as digital tokens on a blockchain. Ownership is fractionalized through this process, which also improves liquidity and creates new

investment opportunities (Deloitte, 2019). By dividing assets into smaller pieces through tokenization, investors can buy fractional shares. Retail investors now have more investment options thanks to this feature, which also allows them to diversify their portfolios by holding portions of several high-value assets (World Economic Forum, 2018).

O3. conventional financial environment transformation: The development of cryptocurrencies has transformed the conventional financial environment by creating new investment opportunities. Since its debut, Bitcoin's value has grown significantly, luring investors looking for sizable returns (Griffin & Shams, 2018). Compared to traditional financial markets, investing in cryptocurrency has fewer entrance requirements. It provides a diverse investment option, allowing those with limited resources and limited access to conventional investment platforms to participate (World Economic Forum, 2020). Investors have the opportunity to take part in new ventures, fund cutting-edge ideas, and perhaps make profits thanks to the channels formed by cryptocurrencies.

5.4. Threats

T1. Security Risks: Due to flaws in exchanges, wallets, and other digital infrastructure, cryptocurrencies are vulnerable to hacking and cyber-attacks. Hackers use a variety of methods, including malware, distributed denial-of-service (DDoS) attacks, phishing, and other methods, to gain unauthorized access and take cryptocurrency. As a result of these security lapses, people and organizations may suffer sizable financial losses, which will erode public confidence in the ecosystem's overall security. Millions of dollars have been lost as a result of cryptocurrency hacks in recent years, underscoring the ongoing danger of hacking in the cryptocurrency industry (Chainalysis, 2021). In addition, the anonymity they offer and the decentralized nature of cryptocurrencies make them appealing targets for fraud and con games. Cybercriminals use deceptive strategies to trick people into disclosing sensitive information or sending money to phony accounts. These attacks prey on human trust and weaknesses, jeopardizing cryptocurrency holders' security and harming the ecosystem's reputation (Krombholz et al., 2019).

T2. Regulatory challenges: Cryptocurrency adoption may be constrained and market dynamics may be impacted by stricter regulations or outright bans in some jurisdictions. For cryptocurrency exchanges and service providers, compliance requirements like know-your-customer (KYC) and anti-money laundering (AML) regulations can raise operational costs and administrative burdens. The accessibility and effectiveness of cryptocurrency transactions may be constrained by these regulatory measures, which aim to protect investors and reduce illegal activity (Foley et al., 2019). Due to issues like investor protection, financial stability, or potentially illegal activities, governments may outlaw some cryptocurrencies or place restrictions on their use.

T3. Competition: As a result of the explosion in the number of cryptocurrencies available on the market, there is competition among them as they compete to stand out and draw in investors. For these cryptocurrencies, gaining dominance and market share are important goals. Metrics such as market capitalization, trading volume, or user adoption are frequently used to calculate market share. While well-known cryptocurrencies like Bitcoin and Ethereum have a sizable market share, new and creative projects are constantly being launched to unseat the leaders and take a bigger share of the market (CoinMarketCap, n.d.).

T4. Technology Obsolescence: Blockchain networks' usability and effectiveness are constantly being improved by new consensus mechanisms, scalability fixes, privacy improvements, and interoperability protocols. These developments advance technology as a whole, but they also present a problem for cryptocurrencies that can't keep up with them (Deloitte, 2019). Cryptocurrencies that are unable to successfully integrate or implement these scalability solutions run the risk of being replaced as users look for quicker and more effective options. To make interoperability easier, new protocols like cross-chain bridges and interoperability standards are being created. Cryptocurrencies that are unable to adapt to these interoperability solutions may encounter usability and connectivity issues, which could eventually cause them to lose some of their utility (World Economic Forum, 2020).

6. ISLAMIC FINANCE VIEW OF CRYPTOCURRENCY CONSIDERING FATWAS AND SCHOLARS

Fatwas and the opinions of scholars have been very important in determining the permissibility and proper execution of various matters throughout Islamic history. The Prophet Muhammad (peace be upon him) was the direct recipient of divine revelations through the angel Gabriel, so the process was relatively simple during his time. But after his demise, it was up to his followers and succeeding generations to interpret and put Islamic teachings into practice. The companions and their successors were well known for their righteousness and in-depth knowledge of Islamic doctrine in the early period, which facilitated the issuance of reliable fatwas. Their decisions were more clearly defined because of the era's simplicity and closeness to the Prophet. They were able to produce more consistent and trustworthy fatwas because they had a wealth of knowledge and real-world experience to draw from (Adam, 2019).

The development of technology and the complexity of modern life have presented new difficulties for Islamic scholars and jurists in issuing fatwas that are in line with Shariah principles. Rapid technological development has created unusual circumstances, some of which may lack clear precedents in traditional Islamic jurisprudence. Because of this, scholars are faced with the difficult task of determining rulings that are in line with Islamic principles. The difficulty scholars encounter when issuing fatwas is best exemplified by the cryptocurrency issue, particularly Bitcoin. The definition of money in the Quran and Sunnah is implicit; instead, they rely on widely accepted community traditions. Therefore, based on the information and understanding at their disposal, scholars have had to examine the nature of cryptocurrencies and assess their compatibility with Islamic principles. When scholars have issued fatwas about cryptocurrencies, Bitcoin has gotten a lot of attention because it is the most well-known cryptocurrency. The lack of a well-established framework and the distinctive characteristics of Bitcoin have prompted scholars to investigate its legality under Shariah (Adam, 2019).

Fatwas are issued by muftis, who are recognized as legal authorities. In addition to dealing with legal regulations, they also respond to questions about morality, etiquette, and general religious affairs. One must complete a rigorous legal education based on the tradition of Islamic jurisprudence to issue a Fatwa in the area of Islamic

finance. For issuing Fatwas about these areas, knowledge of Islamic commercial law and finance is necessary. In conclusion, a Fatwa is a response or decision made following Shariah on a variety of issues, and Muftis have advanced legal education and experience (Adam, 2019).

Between scholars and fatwa houses, there is disagreement over the legality of cryptocurrencies like Bitcoin, with one camp holding that it is prohibited (haram) and another that it is permissible in principle. Scholars from various nations have supported these opposing opinions, each of whom has justified their position. However, fatwas concerning cryptocurrencies can differ due to the dynamic nature of technology and the lack of clear instructions from authoritative Islamic sources. Given how complex and novel the topic is, disagreements and divergent viewpoints among scholars are not unusual.

6.1. Cryptocurrency is Permissible

Cryptocurrencies are permissible in Islamic finance, according to recognized approvals. In the world of cryptocurrency, only a small number of authorized people have permitted it to be used in line with Islamic ideals. Scholars like Dr. Abdullah bin Abdul-Wahhab Al-Aqeel, who wrote "Fiqh Regulations in Cryptocurrencies," and Dr. Nayef Al-Ajmi from Kuwait, who gave an online talk called "Legitimacy and Sharia Rulings of Digital Transactions," have written about the topic (Babas, 2021).

Based on what they said, the following key points can be made about whether or not cryptocurrency is allowed in Islam:

1. The basis for Permissibility: Islamic banking allows dealing with cryptocurrencies like Bitcoin.
2. Legitimacy as Currency: A cryptocurrency is a valid form of cash because it can be exchanged for other currencies, goods, and services.
3. Monetary Functions: Cryptocurrencies work as money, even though they are not issued by a central government body.
4. Mining and Authentication: It's okay to do things like mining and authentication to get cryptocurrency, whether you own the tools and software yourself or rent them from a third party.

5. Exchange and Trading: In Islamic banking, it's okay to buy cryptocurrency with government-issued money, accept it in commodity exchanges, or trade it for other cryptocurrencies that are allowed.
6. Exchange Rules and Zakat: Cryptocurrencies like Bitcoin are subject to exchange rules and may fall under the same rules for Zakat as cash amounts.

These insights shed light on the permissibility of cryptocurrency within the framework of Islamic finance, providing valuable guidance for individuals seeking to engage in such transactions while involve in Islamic principles.

Another scholar who agrees with the permissibility of cryptocurrency Sheikh Dr. Muhammad Taqi Usmani is a renowned Islamic scholar and Shariah adviser. He contends that under certain circumstances, cryptocurrencies can be regarded as acceptable in Islam. He contends that cryptocurrencies can be classified as halal if they meet the requirements of a recognized and stable currency, are backed by a legal asset or commodity, and are subject to a fair and transparent system. To stop illegal activities, he also stresses the significance of ensuring that anti-money laundering and know-your-customer regulations (AML/KYC) are followed (Usmani, 2018).

Dr. Monzer Kahf: According to Dr. Monzer Kahf, an Islamic economist and scholar, cryptocurrencies can be regarded as acceptable if they meet certain requirements. He stresses the significance of abstaining from illegal practices like usury (riba) and gambling (maysir) when conducting cryptocurrency transactions. He contends that cryptocurrencies can be used as a medium of exchange and a store of value under these circumstances, making them acceptable in Islamic finance (Kahf, 2018).

Sheikh Dr. Haitham al-Haddad: According to Sheikh al-Haddad, an Islamic scholar and jurist, cryptocurrencies can be considered halal if certain requirements are met. He contends that cryptocurrencies can be viewed as acceptable so long as they are not used for illegal or haram activities and do not involve excessive speculation. To avoid potential fraud or manipulation, he also emphasizes the significance of transparency and accountability in cryptocurrency transactions (Al-Haddad, 2019).

Datuk Dr. Mohammad Daud Bakar, a well-known Malaysian Shari'ah expert, supports Bitcoin. He asserted that the Shari'ah takes the position that a matter is permissible by default unless sufficient justification can be offered to make it unlawful. Cryptocurrencies should not be an exception, for this reason. He made the point that

cryptocurrencies are more secure than even the fiat money we use because of the sophisticated algorithm coding and improved security. Even though speculation is prohibited, he continued, there must be proof that it is unfair and manipulative; otherwise, the mere fact of speculation does not make something illegal. Additionally, he added that Bitcoin's volatility and value fluctuations do not always indicate gharar (uncertainty), but rather the presence of a significant risk. Additionally, gharar (uncertainty) and khatar (risk) need to be distinguished from one another because, while gharar is forbidden in Islam, khatar is accepted as a form of justification for profit and liability. As a final point, the fact that Bitcoin is not recognized as a legal tender is administrative rather than a Shari'ah issue. According to him, this is not a necessary condition for something to be recognized by the Shari'ah as a legal tender (Habib, 2021).

Moreover, The fatwa center of Darul Uloom Zakariyya, an Islamic seminary in South Africa, says that Bitcoin is allowed in Islamic finance, but not as a currency. Instead, they see it as something good. From their point of view, trading in Bitcoin is allowed because it meets the requirements of mal, which are ownership and possession. But they stress that getting permission from the right government agencies is important if Bitcoin is to be seen as a currency. This opinion shows how Darul Uloom Zakariyya has a nuanced view of whether Bitcoin is allowed within the framework of Islamic finance. It says that Bitcoin could be a good investment, but that it needs to be regulated and recognized by the government to be considered a real currency (Abu-Bakar, 2018).

6.2. Cryptocurrency is Impermissible

The Committee of Jurisprudence and Fatwa of the International Union of Muslim Scholars made the decision. It discusses how to deal with Bitcoin and other cryptocurrencies that are not recognized by the government. The committee says that it is against the rules to do business with these currencies in their current t form. Several key points made by the committee in favor of the decision show that it was the right choice.

First, the committee says that, according to Islamic law and economic principles, these cryptocurrencies don't have the most important qualities of traditional currencies. For things to be used as money, they need to be stable and have a moderate value compared to other types of money. Also, they should be used as a medium of exchange,

a way to measure value, a place to store wealth, and a standard for paying off debt in the future. But Bitcoin and other cryptocurrencies like it don't meet these requirements, so they can't be used as real currencies.

The committee also says that these cryptocurrencies don't do the most important things that money does. Bitcoin and other cryptocurrencies don't have the same functions as traditional currencies, which serve as general means of exchange, units of account, stores of value, and ways to pay later. They are not widely used as a way to buy and sell things in the real world, and they are not a good way to save money. The fact that they can't do basic things with money makes them less legitimate and useful than money. The committee also stresses that cryptocurrencies are not commodities in the traditional sense because their main purpose is to be traded, not because they have value in and of themselves. They don't have any physical assets, goods, or services that most people would think of as money. So, they don't fit into any of the well-known types of money, like gold, silver, or legal tender. Moreover, the committee talks about the possible risks and bad things that could happen when Bitcoin and other cryptocurrencies are used for transactions. These include helping to launder money, allowing the illegal trade of drugs and weapons, and making it easier to send money that was earned through illegal activities. These kinds of activities help make crime, fraud, and financial scams more common. So, the committee thinks that dealing with these currencies and doing business with them goes against the goals and principles of Islamic finance (*قرار رقم (1) الصادر عن لجنة الاجتهاد والفتوى بشأن التعامل بعملة البيتكوين والعملات الرقمية*, n.d.). It's important to note that the ruling doesn't cover cryptocurrencies that governments or central banks have issued or backed. Because these currencies are backed by regulatory bodies and monetary authorities, they may be allowed in a certain jurisdiction.

There are a lot of scholars who consider that cryptocurrencies impressive. For instance, in an interview with Al Jazeera at the end of 2017, Shaykh Dr. Ali al-Qurra Dagi said that Bitcoin and other cryptocurrencies were not allowed to be bought or sold at that time. But he did say that cryptocurrencies could be Shari'ah-compliant. Dr. Ali came up with three ideas for how to make cryptocurrencies legal and keep investors from losing money.

First, he suggested that cryptocurrencies should have a governing body and set of rules. He said that Islam can't be accepted without a system and rules. A country could

use cryptocurrency as its main or secondary currency as one option. Another idea was for a group of banks to work together to issue regulated cryptocurrencies. This would allow for oversight and control. Dr. Ali also suggested that cryptocurrencies be made into joint-stock companies, where developers and investors would both own a part of the cryptocurrency. Dr. Ali emphasized that even though cryptocurrencies are called "currencies," they do not work or act like currencies right now. He said that the word "currencies" had nothing to do with legal analysis and instead focused on what cryptocurrencies are and how they work. He said that cryptocurrencies don't work as a means of exchange, don't have the qualities of a way to store value, and don't work as a way to pay later. Dr. Ali also disagreed with the idea that cryptocurrencies are "crypto assets" because they don't have any real value. At the time of his research, he concluded that Bitcoin and other cryptocurrencies could not be used to do business without proper government oversight (Al Jazeera, 2017).

Sheikh Dr. Haitham al-Haddad is an Islamic scholar and legal expert who is cautious when it comes to cryptocurrencies. He expresses reservations about the lack of government regulation, the high volatility of cryptocurrencies, and their potential to facilitate illegal activities while acknowledging the potential advantages of blockchain technology. He contends that cryptocurrencies should be viewed as illegal until appropriate regulations are put in place and the risks associated with them are adequately addressed (AL-Haddad, 2019).

Sheikh Dr. Assim al-Hakeem: Sheikh al-Hakeem is an Islamic lecturer and scholar who believes that Bitcoin and other cryptocurrencies are forbidden in Islam. He contends that cryptocurrencies' value is solely determined by supply and demand dynamics and lacks an accurate and transparent valuation mechanism. He also draws attention to the absence of a central authority and government support, which raises questions about accountability and financial stability. He concludes that cryptocurrencies are prohibited based on these factors (Al-Hakeem, 2020).

According to Anas Amatayakul, a Shari'ah advisor to the Islamic Bank of Thailand. Amatayakul stated in an interview with the Washington Post that cryptocurrency, including Bitcoin, is still in its infancy and should be given time to mature and develop before any firm decisions can be made. He advised Muslims to hold off on using cryptocurrencies until more information is available. As he sees risks in the

rapidly changing cryptocurrency landscape, Amatayakul's main concern is protecting people's wealth (De Vynck, 2022).

In an interview, Sheikh Sajid Umar brought up how some Middle Eastern academics view cryptocurrencies as illegal forms of money. He made it clear, though, that this ban only applies to using it as a means of exchange rather than as a goal in and of itself. According to Umar, there are two types of haram: things that are already prohibited, like alcohol and riba (usury), and things that can result in haram. Based on this classification, Umar proposed that cryptocurrency might be acceptable as a form of payment in special cases because it is not inherently illegal (Umar, 2021).

In his analysis of cryptocurrencies from the point of view of Shari'ah, Dr. Abdus Sattar Abu Ghuddah says that Bitcoin is not a real currency. He says that Bitcoin isn't a cryptocurrency because it doesn't have the right features and functions, and it's not a currency because it doesn't have the four features of a currency. First, a currency should be able to be used as a unit of account. Bitcoin doesn't do this because it isn't used to price goods or services very often. Second, a currency needs to be used widely as a means of exchange, but Bitcoin can only be used in certain places and networks. Third, Bitcoin's volatility makes it hard to know if it can keep its value over time as a way to save money. Lastly, a currency should be recognized by an official body or authority, which Bitcoin does not have. Dr. Abdus Sattar also disagrees with the idea that Bitcoin is a commodity, because commodities have uses and benefits for their owners, while Bitcoin doesn't have any uses or benefits of its own. So, based on these points, Dr. Abdus Sattar concludes that Bitcoin is neither a currency nor a good according to Shari'ah (Adam, 2019).

6.3. Muslim Countries' Fatwas

Islamic finance has previously shown that it can adjust to changing conditions. Even if an object does not completely fit the traditional definition of a currency, scholars have taken into account important factors like the existence of a central authority. The adoption of fiat currency into Islamic finance following the end of the gold standard is an illustration of this adaptability. Fiat money could only be used if it was issued and

guaranteed by a reputable institution, like the US government. Since cryptocurrencies are so heavily shrouded in anonymity, concerns are raised. Scholars point out that cryptocurrencies lack a recognizable authority behind their issuance and that the identities of the people issuing them are frequently unknown. One such scholar is Anas Amatayakul. The legitimacy of cryptocurrencies within Islamic finance is questioned by their anonymity, lack of centralized authority oversight, and state guarantees (De Vynck, 2022).

Additionally, cryptocurrencies like Bitcoin lack state auditing and supervision as well as central authority oversight, according to the Turkish Directorate of Religious Affairs (Diyanet). They are not as closely monitored and regulated as conventional currencies as a result (Hurriyet Daily News, 2017, p. 1). Magdy Ashour, the counselor to the Egyptian Grand Mufti, also voiced concerns about the lack of a clear set of regulations for cryptocurrencies. The absence of a clear framework, in Ashour's opinion, conflicts with the Islamic demand that contracts follow established guidelines, potentially making cryptocurrency transactions problematic (Middle East Monitor, 2018).

Scholars have voiced serious concerns about the prevalence of scams and fraudulent activities in the crypto sphere. There have been cases of "rug pulls" where people advertise new currencies and persuade investors to invest their money, only to vanish with the funds they had raised. Within a conventional fiat currency system, this kind of fraud is impossible. In a fatwa declaring Bitcoin to be forbidden in Islam, Egypt's Dar Al Iftaa emphasized the potential risks it poses to the nation's social and economic security. They contend that the currency has the potential to undermine national security and the monetary system at large (Middle East Monitor, 2018).

Another issue brought up by Ashour from Dar Al Ifta is the use of Bitcoin for financing terrorism. The economy may suffer as a result of this factor. The Supreme Fatwa Council of Palestine claims that Bitcoin is neither a price nor a commodity because it lacks the necessary elements of a price and does not satiate consumer desires like conventional commodities. It is regarded as an electronic tool for accumulating wealth. Because of things like high uncertainty (gharar), resemblance to gambling (qimar), anonymity of the issuer, volatility, and the possibility of hardship, fraud, and deception, it is therefore forbidden (Habib, 2021).

According to Mufti Shawki Allam, cryptocurrency trading is prohibited (haram), for the same reasons as those already stated. He draws attention to the fact that no legitimate institutions, like the Treasury Departments of States, have endorsed it as a valid form of exchange. Additionally, he notes that cryptocurrencies are similar to gambling and can be used to facilitate money laundering and illicit trades (AIMS, 2019).

It's worthwhile to see how there are varying views among scholars about whether cryptocurrencies are permitted in Islamic finance due to issues like anonymity, lack of centralized authority oversight, state guarantees, and clearly defined rules. The Islamic finance community has been debating and studying cryptocurrencies due to their evolving nature and the complexity they introduce. Some say they should be regulated and supervised to fit into Islamic finance, while others say they should not be used at all because they are risky and don't follow Islamic principles.

DISCUSSIONS, RESULTS, CONCLUSION

Discussions

The Islamic finance view of cryptocurrency varies among scholars and fatwa houses. There are differing opinions regarding the permissibility of cryptocurrencies like Bitcoin within the framework of Islamic principles. Some scholars argue that cryptocurrency is permissible in Islamic finance, while others consider it impermissible. Those who argue for the permissibility of cryptocurrency provide several justifications. They emphasize that dealing with cryptocurrencies is allowed by Islamic banking and that they can serve as an authorized form of currency. They contend that cryptocurrencies can be mined and authenticated, can be used as a medium of exchange for other currencies, goods, and services, and have monetary functions. Additionally, they claim that Islamic banking allows the buying and selling of cryptocurrencies, and cryptocurrencies may be subject to exchange rules and zakat. On the other hand, scholars who argue against the permissibility of cryptocurrency raise concerns about its compatibility with Islamic principles. They argue that cryptocurrencies lack characteristics such as stability, moderate value, and the functions of money, which are necessary for traditional currencies. They generate attention to the risks and possible misuse that come with cryptocurrencies, including the possibility of money laundering, illicit trade, and the facilitation of criminal activity.

The opinions and fatwas of scholars regarding the permissibility of cryptocurrency in Islamic finance provide valuable insights and perspectives on this complex issue.

Scholars such as Dr. Abdullah bin Abdul-Wahhab Al-Aqeel and Dr. Nayef Al-Ajmi argue that cryptocurrencies can be accepted as legitimate payment methods for goods, services, and other currencies in Islamic banking (Babas, 2021). Despite the lack of central government support, scholars such as Dr. Mohammad Taqi Usmani and Sheikh Dr. Haitham al-Haddad believe cryptocurrencies are legitimate forms of payment (Al-Haddad, 2019) & (Usmani, 2018). Scholars such as Dr. Monzer Kahf emphasize the importance of ensuring that cryptocurrency transactions are following Islamic principles (Kahf, 2018). These transactions should function as mediums of exchange

and stores of value while avoiding illegal activities such as usury (riba) and gambling (maysir). These scholars argue that cryptocurrencies are permissible within the framework of Islamic finance, emphasizing their potential as legal payment methods and emphasizing the importance of adhering to Islamic principles when conducting cryptocurrency transactions.

Scholars who focus on regulatory considerations, such as Sheikh Dr. Haitham al-Haddad and Datuk Dr. Mohammad Daud Bakar, emphasize the importance of accountability, transparency, and compliance with anti-money laundering and know-your-customer regulations. They argue that appropriate regulations and safeguards are required to prevent illegal activities and ensure fair transactions in the cryptocurrency realm (Al-Haddad, 2019; Habib, 2021).

Scholars such as Datuk Dr. Mohammad Daud Bakar distinguish between gharar (uncertainty) and khatar (risk) when discussing risk and uncertainty. While gharar is forbidden in Islam, khatar is an acceptable form of risk. They argue that the volatility and fluctuations seen in cryptocurrencies do not always indicate gharar, but rather the presence of significant risks (Habib, 2021).

In terms of government recognition, the fatwa center of Darul Uloom Zakariyya recognizes Bitcoin's potential within Islamic finance, though not necessarily as a currency. They support Bitcoin and allow trading based on the principles of ownership and possession (mal). They do, however, emphasize the importance of obtaining permission from the appropriate government agencies for Bitcoin to be recognized as a legal currency.

Scholars who consider cryptocurrency, such as Bitcoin, to be impermissible in Islam provide several reasons to support their stance.

First, the International Union of Muslim Scholars' Committee of Jurisprudence and Fatwa warns against dealing with cryptocurrencies that are not recognized by governments. According to Islamic law and economic principles, these cryptocurrencies lack the essential characteristics of traditional currencies. To be considered money, something must be stable, have a moderate value in comparison to other types of money, serve as a medium of exchange, a measure of value, a store of wealth, and a means of paying off future debts. However, cryptocurrencies such as Bitcoin do not meet these criteria, making them unsuitable for use as real currencies. Furthermore,

cryptocurrencies do not fulfill the essential functions of traditional currencies, such as being widely accepted as a medium of exchange, serving as a unit of account, effectively storing value, and facilitating deferred payments. The committee emphasizes the potential risks associated with cryptocurrencies, such as money laundering, illegal trade, and facilitating financial scams, which are contrary to the principles and goals of Islamic finance (قرار رقم (1) الصادر عن لجنة الاجتهاد والفتوى بشأن التعامل بعملة البيتكوين والعملات الرقمية, n.d.).

Other scholars, including Sheikh Dr. Haitham al-Haddad and Sheikh Dr. Assim al-Hakeem, are skeptical of cryptocurrencies due to a lack of government regulation, high volatility, and the potential facilitation of illegal activities. They argue that cryptocurrencies should be considered prohibited in Islam until appropriate regulations are put in place and the associated risks are adequately addressed (AL-Haddad, 2019; Al-Hakeem, 2020). Dr. Abdus Sattar Abu Ghuddah investigates cryptocurrencies, particularly Bitcoin, from a Shari'ah standpoint and concludes that they do not meet the definition of a currency. According to his analysis, Bitcoin lacks the essential characteristics and functions of a currency, such as widespread use as a unit of account, a means of exchange, a store of value, and official recognition. He also rejects the notion that Bitcoin is a commodity because it lacks inherent uses and benefits. Based on these considerations, Dr. Abdus Sattar concludes that Bitcoin is neither a currency nor a good in the Shari'ah sense (Adam, 2019).

Furthermore, scholars express concerns about cryptocurrencies' anonymity, lack of centralized authority oversight, and lack of state guarantees. The Turkish Religious Affairs Directorate (Diyanet) emphasizes the importance of centralized authority oversight and state guarantees in Islamic finance, which cryptocurrencies lack due to their anonymity. Scholars such as Egypt's Dar Al Iftaa's Magdy Ashour are concerned about the lack of a clear set of regulations and frameworks for cryptocurrencies. They argue that the lack of established guidelines for cryptocurrency transactions is incompatible with the Islamic requirement for contracts to adhere to predefined rules (Hurriyet Daily News, 2017; Middle East Monitor, 2018).

Scholars are also concerned about the prevalence of scams and fraudulent activities in the cryptocurrency realm. The risks to social and economic security, as well as the facilitation of terrorist financing, are also highlighted. These factors contribute to

the argument that cryptocurrencies pose risks to the monetary system and society as a whole (Middle East Monitor, 2018; Habib, 2021).

Sheikh Dr. Ali al-Qurra Dagi contends that cryptocurrencies can be considered permissible if they have a clear and transparent structure, are not associated with fraudulent activities, and comply with legal and regulatory frameworks. He emphasizes the importance of adhering to ethical principles and refraining from engaging in activities that are incompatible with Islamic values. On the other hand, he emphasizes the importance of caution and proper understanding when dealing with cryptocurrencies. He advises people to educate themselves about the risks involved, such as volatility and the possibility of financial loss. Furthermore, he encourages Muslims to seek advice from experts who are well-versed in both Islamic jurisprudence and the complexities of cryptocurrencies (Al Jazeera, 2017).

Results

A basic model for an Islamic cryptocurrency can be suggested based on aspects of cryptocurrencies and the opinions of Islamic scholars. The following are some key elements that could be included in an Islamic cryptocurrency:

1. Central Bank Supervision: In an Islamic cryptocurrency model, the central bank would be in charge of overseeing the cryptocurrency's operations and regulation. This would establish a centralized authority responsible for ensuring compliance with Islamic principles, regulatory requirements, and monetary policy objectives. The Islamic cryptocurrency can benefit from the expertise and resources of a trusted institution by involving the central bank. To maintain the integrity and stability of cryptocurrency, the central bank can establish regulations, conduct audits, and enforce compliance.
2. Compliance with Islamic Principles: An Islamic cryptocurrency should be designed in such a way that it adheres to Islamic principles such as the prohibition of riba (usury) and gharar (uncertainty).
3. Shariah Supervision: The cryptocurrency could form a Shariah advisory board made up of qualified Islamic scholars who would oversee its operations and ensure compliance with Islamic principles. This board would provide

guidance and rulings on specific issues concerning cryptocurrency compliance.

4. Asset-Backed Model: An Islamic cryptocurrency could use an asset-backed model, in which each unit represents ownership or rights to a tangible asset or a specific business venture. This would give the cryptocurrency intrinsic value and alleviate gharar concerns.
5. Ethical Investments: The cryptocurrency could prioritize investments in ethical and socially responsible projects while avoiding industries and activities deemed harmful or prohibited by Islam, such as gambling, alcohol, or weapons. The cryptocurrency should not be associated with any illegal activities, such as money laundering, terrorist financing, or fraudulent practices. Profit and Loss Sharing: The cryptocurrency could include profit and loss sharing mechanisms, allowing cryptocurrency holders to share in the financial success or failure of the underlying assets or projects. This is consistent with the Islamic principle of risk-sharing equity.

I concluded that these results build on existing evidence of the proposed model that was presented by the author (Babas, 2021) "Cryptocurrency industry in the balance of Islamic jurisprudence and prospects for creating an Islamic digital currency (A proposed model)". Her proposed model shares many similarities and compatibilities with the Islamic cryptocurrency model I suggested.

The proposed model for the mechanism of the Islamic digital currency involves several key actors, including the Central Bank, Islamic banks, the Sharia Supervisory Board, the Islamic Capital Market, and its Supervisory Board, economic dealers, and society (Babas, 2021)

1. In this model, the Central Bank issues digital currency alongside paper money, leveraging blockchain technology to improve transparency and facilitate tracking of currency and Islamic bank activities. The Central Bank retains its traditional functions, such as lending of last resort, monetary policy management, acting as a bank for banks, and currency issuance.
2. Islamic banks play an important role as go-betweens for the Central Bank and economic dealers. Based on Islamic finance principles, they conduct virtual currency exchanges with the Central Bank, participate in the money market

as financiers, organize virtual exchanges with customers, attract deposits, grant loans and financing (including digital currency), and conduct Islamic capital market transactions. Islamic banks use ledger and blockchain technology to verify financial transactions and register partial blocks for transmission to the Central Bank.

3. The Sharia Supervisory Board is made up of banking and legal professionals who issue fatwas (legal opinions) on the legality of Central Bank and Islamic bank transactions. To maintain stability, they use the blockchain to ensure compliance with these fatwas and to determine the value of the Islamic digital currency by linking it to an agreed-upon economic index.
4. The Islamic Capital Market and its Supervisory Board are in charge of overseeing the issuance and distribution of Sharia-compliant financial instruments such as shares and sukuks. Brokers (Islamic banks) register partial blocks for transmission to the Islamic Capital Market Supervision Authority to create total blocks that are published on the blockchain network.
5. Smart contracts are used by economic dealers such as buyers, sellers, surplus agents, and deficit agents to transact in paper or digital currency as needed. They have electronic wallets with unique addresses that allow them to securely send and receive digital currency. While their identities are kept private on the blockchain network, Islamic banks, the Central Bank, and the Islamic Capital Market Operations Supervision Authority are aware of them to prevent fraudulent activities.
6. The model benefits society as a whole by providing transparent access to track transactions, ensuring compliance with Islamic law, understanding product origins and distribution, and adhering to payment methods.

Conclusion

In conclusion, this research article explores the relationship between cryptocurrencies and Islamic finance, to determine whether cryptocurrency is compatible with Islamic principles and proposes a Sharia-compliant cryptocurrency model. It begins by discussing the rapid growth of Islamic finance and the challenges posed by the inclusion of cryptocurrencies in its system. One of the main concerns is the

high price volatility of cryptocurrencies, which goes against the principles of stability and certainty in Islamic finance. Additionally, the decentralized nature of cryptocurrencies and the lack of backing from a recognized authority raise questions about their intrinsic value and permissibility in Islamic finance.

The research article then conducts a SWOT analysis of cryptocurrencies, highlighting their strengths, weaknesses, opportunities, and threats. This analysis provides valuable insights for investors, financial institutions, regulators, and society in understanding the implications of cryptocurrencies. It emphasizes the importance of staying informed about the evolving cryptocurrency market and regulatory changes.

Next, the article reviews the literature on the subject, including the history and definition of money, the emergence of cryptocurrencies like Bitcoin, and the principles of Islamic finance. It discusses the different perspectives of Islamic scholars and fatwas regarding the permissibility of cryptocurrency in Islamic finance. Some scholars argue that cryptocurrencies can be considered legitimate forms of payment and highlight their potential as authorized currencies. Others raise concerns about the lack of stability, moderate value, and adherence to Islamic principles in cryptocurrencies. The discussions among scholars revolve around factors such as transparency, accountability, risk-sharing, prohibition of usury, and regulatory considerations. Some scholars advocate for appropriate regulations to prevent illegal activities and ensure fair transactions in the cryptocurrency realm. Others emphasize the importance of adherence to Islamic principles and the need for cryptocurrencies to fulfill the essential functions of traditional currencies.

In light of the findings, the research article aims to propose a Sharia-compliant cryptocurrency model that addresses the identified concerns and promotes adherence to Islamic principles. This model seeks to bridge the gap between cryptocurrencies and Islamic finance, enabling Muslims to participate in the digital economy while upholding their religious beliefs and values.

The research holds significant importance as it contributes to understanding the relationship between cryptocurrencies and Islamic finance principles. It provides insights that can guide policymakers, regulators, financial institutions, and individuals in navigating the intersection of cryptocurrencies and Islamic finance. Furthermore, it opens avenues for further research and exploration of ethical financial solutions in the

digital era, promoting financial inclusion and advancing the development of Islamic finance within the rapidly evolving landscape of technology and digital currencies.

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